S/M No.TCP850FEF0

Service Manual

CHASSIS : CP-850/F

MODEL : DTK-28
DTK-29

Caution
: In this Manual, some parts can be changed for improving. their performance without notice in the parts list. So, if you need the latest parts information, please refer to PPL(Parts Price List)in Service Information Center.

DAEWOO ELECTRONICS

JUN.2006

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1 MAIN FEATURES

1.1 SPECIFICATIONS

1.1.1 GENERAL

TV standard		PAL - SECAM B/G D/K, PAL I/I, SECAM L/L'
Colour system	Tuner	PAL, SECAM
	AV	PAL, SECAM, PAL 60, NTSC M, NTSC 4.43
Sound system		NICAM B/G, I, D/K, L, FM 2Carrier B/G, D/K
Power consumption		29"(4:3) Real Flat :110W approx. 28"(16:9) Real Flat : 110W approx.
Sound Output Power		7W x 2 (at 60% mod, 10%THD)
Speaker		12W 8 ohm x2
Teletext system		9 pages memory FASTEXT (FLOF or TOP)
Aerial input		75 ohm unbalanced
Channel coverage		Off-air channels, S-cable channels and hyperband
Tuning system		frequency synthesiser tuning system
Visual screen size		28" : 66cm 29" : 68cm
Channel indication		On Screen Display
Program Selection		100 programmes
Aux. terminal		EURO-SCART 1 : Audio / Video In and Out, R/G/B In, Slow and Fast switching. EURO-SCART 2 : Audio / Video In and Out, SVHS In. AV3 : Audio-Video Jack on front of cabinet. Headphone jack (3.5 mm) on front of cabinet SVHS3 (option) : Jack on front of cabinet /sound input common with AV3.
Remote Control		R-49C05

1.1.2 EURO-SCART 1 (21 Pin)

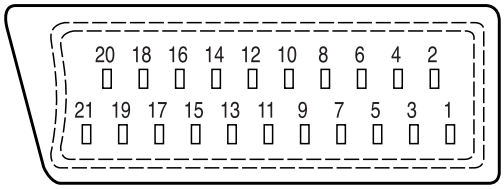
Pin	Signal Description	Matching value
1	Audio Output Right	0.5 Vrms, Impedance < 1 kΩ, (RF 54% Mod)
2	Audio Input Right	0.5 Vrms, Impedance > 10 kΩ
3	Audio Output Left	0.5 Vrms, Impedance < 1 kΩ, (RF 54% Mod)
4	Audio Earth	
5	Blue Earth	
6	Audio Input Left	0.5 Vrms, Impedance > 10 kΩ
7	Blue Input	0.7 Vpp ±0.1V, Impedance 75 Ω

1.2 CHANNEL/FREQUENCY TABLE

9	Green Earth	
10	N.C.	
11	Green Input	0.7 Vpp ± 0.1V, Impedance 75Ω
12	N.C.	
13	Red Earth	
14	Blanking Earth	
15	Red Input	0.7 Vpp ±0.1V, Impedance 75Ω
16	Fast Switching	0 to 0.4V : Logic "0", 1 to 3V : Logic "1", Impedance 75Ω
17	Video Out Earth	
18	Video In Earth	
19	Video Output	1 Vpp ± 3dB, Impedance 75Ω
20	Video Input	1 Vpp ± 3dB, Impedance 75Ω
21	Common Earth	

1.2.1 CHANNEL/FREQUENCY TABLE

Pin	Signal Description	Matching value
1	Audio Output Right	0.5 Vrms, Impedance < 1 kΩ (RF 54% Mod)
2	Audio Input Right	0.5 Vrms, Impedance > 10 kΩ
3	Audio Output Left	0.5 Vrms, Impedance < 1 kΩ, (RF 54% Mod)
4	Audio Earth	
5	Earth	
6	Audio Input Left	0.5 Vrms, Impedance > 10 kΩ
7	N.C.	
8	N.C.	
9	N.C.	
10	N.C.	
11	N.C.	
12	N.C.	
13	Earth	
14	Earth	
15	Chroma Input	±3dB for a luminance signal of 1 Vpp
16	N.C.	
17	Earth	
18	Video In Earth	
19	Video Output	1 Vpp ± 3dB, Impedance 75Ω (Monitor output)
20	Video Input, Y In.	1 Vpp ± 3dB, Impedance 75Ω
21	Common Earth	



CHANNEL	EUROPE CCIR	FRANCE	GB(IRELAND)	EAST OIRT
C01	46.25	-	45.75	49.75
C02	48.25	55.75 (L)	53.75	59.25
C03	55.25	60.5 (L)	61.75	77.25
C04	62.25	63.75 (L)	175.25	85.25
C05	175.25	176.00	183.25	93.25
C06	182.25	184.00	191.25	175.25
C07	189.25	192.00	199.25	183.25
C08	196.25	200.00	207.25	191.25
C09	203.25	208.00	215.25	199.25
C10	210.25	216.00	223.25	207.25
C11	217.25	189.25 (LUX)	231.25	215.25
C12	224.25	69.25 (L)	239.25	223.25
C13	53.75	76.25 (L)	247.25	-
C14	-	83.25 (L)	49.75	-
C15	82.25	90.25	57.75	-
C16	-	97.25	65.75	-
C17	183.75	-	77.75	-
C18	192.25	-	85.75	-
C19	201.25	-	-	-
C20	-	-	-	-
C21	471.25	471.25	471.25	471.25
C22	479.25	479.25	4 79.25	479.25
C23	487.25	487.25	487.25	487.25
C24	495.25	495.25	495.25	495.25
C25	503.25	503.25	503.25	503.25
C26	511.25	511.25 5	11.25	511.25
C27	519.25	519.25	519.25	519.25
C28	527.25	527.25	527.25	527.25
C29	535.25	535.25	535.25	535.25
C30	543.25	543.25	543.25	543.25
C31	551.25	551.25	551.25	551.25
C32	559.25	559.25	559.25	559.25
C33	567.25	567.25	567.25	567.25
C34	575.25	575.25	575.25	575.25
C35	583.25	583.25	583.25	583.25
C36	591.25	591.25	591.25	591.25
C37	599.25	599.25	599.25	599.25
C38	607.25	607.25	607.25	607.25
C39	615.25	615.25	615.25	615.25
C40	623.25	623.25	623.25	623.25
C41	631.25	631.25	631.25	631.25
C42	639.25	639.25	639.25	639.25
C43	647.25	647.25	647.25	647.25
C44	655.25	655.25	655.25	655.25
C45	663.25	663.25	663.25	663.25
C46	671.25	671.25	671.25	671.25
C47	679.25	679.25	679.25	679.25
C48	687.25	687.25	687.25	687.25
C49	695.25	695.25	695.25	695.25
C50	703.25	703.25	703.25	703.25
C51	711.25	711.25	711.25	711.25
C52	719.25	719.25	719.25	719.25
C53	727.25	727.25	727.25	727.25
C54	735.25	735.25	735.25	735.25
C55	743.25	743.25	743.25	743.25
C56	751.25	751.25	751.25	751.25
C57	759.25	759.25	759.25	759.25
C58	767.25	767.25	767.25	767.25

CHANNEL	EUROPE CCIR	FRANCE	GB(IRELAND)	EAST OIRT
C59	775.25	775.25	775.25	775.25
C60	783.25	783.25	783.25	783.25
C61	791.25	791.25	791.25	791.25
C62	799.25	799.25	799.25	799.25
C63	807.25	807.25	807.25	807.25
C64	815.25	815.25	815.25	815.25
C65	823.25	823.25	823.25	823.25
C66	831.25	831.25	831.25	831.25
C67	839.25	839.25	839.25	839.25
C68	847.25	847.25	847.25	847.25
C69	855.25	855.25	855.25	855.25
C70	863.25	863.25	863.25	863.25
C71	69.25	-	-	-
C72	76.25	-	-	-
C73	83.25	-	-	-
C74	90.25	-	-	-
C75	97.25	-	-	-
C76	59.25	-	-	-
C77	93.25	-	-	-
S01	105.25	104.75	103.25	105.25
S02	112.25	116.75	111.25	112.25
S03	119.25	128.75	119.25	119.25
S04	126.25	140.75	127.25	126.25
S05	133.25	152.75	135.25	133.25
S06	140.25	164.75	143.25	140.25
S07	147.25	176.75	151.25	147.25
S08	154.25	188.75	159.25	154.25
S09	161.25	200.75	167.25	161.25
S10	168.25	212.75	-	168.25
S11	231.25	224.75	-	231.25
S12	238.25	236.75	-	238.25
S13	245.25	248.75	255.25	245.25
S14	252.25	260.75	263.25	252.25
S15	259.25	272.75	271.25	259.25
S16	266.25	284.75	279.25	266.25
S17	273.25	296.75	287.25	273.25
S18	280.25	136.00	295.25	280.25
S19	287.25	160.00	303.25	287.25
S20	294.25	-	-	294.25
S21	303.25	303.25	-	303.25
S22	311.25	311.25	311.25	311.25
S23	319.25	319.25	319.25	319.25
S24	327.25	327.25	327.25	327.25
S25	335.25	335.25	335.25	335.25
S26	343.25	343.25	343.25	343.25
S27	351.25	351.25	351.25	351.25
S28	359.25	359.25	359.25	359.25
S29	367.25	367.25	367.25	367.25
S30	375.25	375.25	375.25	375.25
S31	383.25	383.25	383.25	383.25
S32	391.25	391.25	391.25	391.25
S33	399.25	399.25	399.25	399.25
S34	407.25	407.25	407.25	407.25
S35	415.25	415.25	415.25	415.25
S36	423.25	423.25	423.25	423.25
S37	431.25	431.25	431.25	431.25
S38	439.25	439.25	439.25	439.25
S39	447.25	447.25	447.25	447.25
S40	455.25	455.25	455.25	455.25
S41	463.25	463.25	463.25	463.25

1.3 ATSS SORTING METHOD

The TV set sweeps all the TV bands from beginning of VHF to end of UHF. The TV controlling software for each program checks if a VPS CNI code is transmitted (this system exists for German, Swiss and Austrian transmissions).
If no VPS CNI code is found, then the system checks if a CNI code is transmitted as part of the teletext transmission (Packet 8/30 format 1 and format 2). If such a code (VPS or teletext) is found and if this code is in the ATSS list, the program is automatically named.
If the transmission does not have VPS CNI, and no teletext service is available, then there is no possibility of the program being automatically named.
The programs found are then sorted in 4 groups :

Group I : It contains all the programs from the selected country and named by the TV controlling software. Within this group the sorting order is fixed by the ATSS list.
Group II : It contains all the programs with a strong signal strength which are not listed in group I.
Group III : It contains all the programs with a weak signal strength which are not listed in group I.
Group IV : If two or more programs with the same code are found, only the strongest (or if they have the same level the one with the lowest frequency) is listed in group I, II or III. The others are listed in group IV.

1.3.1 GENERAL CASE

Program number	Group	Skip
1	Group I	
2		
...		
n		
n+1	Group II	
...		
m		
m+1	Group III	
...		
p		
p+1	Group IV	
...		
q		
q+1	not used	
...		
99		
0		

1.3.2 SPECIAL CASE

Program number	Group	Skip
1	Group II	
...		
m		
m+1	Group III	
...		
p		
p+1	Group IV	
...		
q		
q+1	not used	
...		
99		
0		

Special case : Country selection = Others

Note : If two programs with the same name but a different code are found these two programs are listed in group I, II or III .

The sorting order within group II, III, and IV is based on the channel frequency. The program with the lowest frequency is allocated the first rank in its group, and so forth until the last program of the group which has the highest frequency.

Special case : **France**
If France is selected, the TV controlling software first sweeps all TV bands with France system selected (positive video modulation) and then a second time with Europe system selected (negative video modulation).

Special case : **Switzerland**
If Switzerland is selected the TV controlling software first sweeps all TV bands with Europe system selected (negative video modulation) and then a second time with France system selected (positive video modulation).

Special case : **GB**
Note for satellite receiver users : Before starting ATSS turn on your satellite receiver and tune to "SKY NEWS"
If GB is selected the TV controlling software seeks for programs only in UHF (C21 to C70). The sorting order is :
1 - BBC1
2 - BBC2
3 - ITV
4 - CH4
5 - CH5
6 - NEWS (Sky News)

If two or more "identical" programs (same name but different code e.g. BBC1 and BBC1 Scotland) are found the following programs in the list will be shifted up. (1 - BBC1, 2 - BBC1, 3 -
BBC2, 4 - ITV, 5 - CH4, 6 - CH5, 7 - NEWS, ..)

If one of the programs above is not found, the associated program number remains empty (freq.=467.25 MHz - Skip selected - no name ? system = GB).
example A : 1 - BBC1, 2 - BBC2, 3 - ITV, 4 - -----, 5 - CH5, 6 - NEWS, ...
example B (if 2 BBC1 found) : 1 - BBC1, 2 - BBC1, 3 - BBC2, 4 - ITV, 5 - -----, 6 - CH5, 7 - NEWS, ...

2 SAFETY INSTRUCTION

WARNING: Only competent service personnel may carry out work involving the testing or repair of this equipment.

X-RAY RADIATION PRECAUTION

1. Excessive high voltage can produce potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must not exceed the specified limit. The nominal value of the high voltage of this receiver is 25-26 KV (20"-21") or 26 KV (25" - 28") at max beam current. The high voltage must not, under any circumstances, exceed 27.5 KV (20"), 29KV (21"), 29.5 KV (25") or 30 KV (28"). Each time a receiver requires servicing, the high voltage should be checked. It is important to use an accurate and reliable high voltage meter.

2. The only source of X-RAY Radiation in this TV receiver is the picture tube. For continued X-RAY RADIATION protection, the replacement tube must be exactly the same type tube as specified in the parts list.

SAFETY PRECAUTION

Potentials of high voltage are present when this receiver is operating. Operation of the receiver outside the cabinet or with the back board removed involves a shock hazard from the receiver.
Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high voltage equipment.
Discharge the high potential of the picture tube before handling the tube. The picture tube is highly evacuated and if broken, glass fragments will be violently expelled.
If any Fuse in this TV receiver is blown, replace it with the FUSE specified in the Replacement Parts List.
When replacing a high wattage resistor (metal oxide film resistor) in the circuit board, keep the resistor 10 mm away from circuit board.
Keep wires away from high voltage or high temperature components.
This receiver must operate under AC 240 volts, 5O Hz. NEVER connect to a DC supply or any other voltage or frequency.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this equipment have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-RAY RADIATION protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual and its supplements, electrical components having such features are identified by designated symbol on the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitutes replacement parts which do not have the same safety characteristics as specified in the parts list may create X-RAY Radiation.

3 ALIGNMENT INSTRUCTIONS

3.1 MICROCONTROLLER CONFIGURATION : SERVICE MODE
To switch the TV set into service mode please see instruction below.

1 - Select PR. number 91
2 - Adjust sharpness to minimum and exit all menus.
3 - Within 2 seconds press the key sequence : **RED - GREEN - menu**

The software version is displayed beside the word Service, e.g. “SERVICE V1.00”.
To exit SERVICE menu press menu key or **Stand By** key.

3.2 SERVICE MODE NAVIGATION
Pr Up/Down remote keys : cycle through the service items available.
Vol -/+ remote keys : Dec./Increment the values within range - Cycle trough option bits.
OK key : Toggle bits in option byte

Order	Item	Default setting
1	HOR CEN	
2	RED GAIN	
3	GRN GAIN	
4	RED BIAS	
5	GRN BIAS	
6	AGC LEVEL	
7	G2 - SCREEN	
8	AFT	
9	OPTION1	
10	OPTION2	
11	OPTION3	
12	AVL	
13	PARABOLA	
14	HOR WIDTH	
15	CORNER T	
16	CORNER B	
17	HOR. PARAL	
18	V.LINEAR	
19	EW TRAPEZ	
20	S CORRECT	
21	VERT CENT	
22	VERT SIZE	
23	SHIPPING	
24	INST. LOCK	HOTEL FUNCTION
25	LKB LOCK	
26	AV1 START	
27	MAX. VOL	

3.3 MICROCONTROLLER CONFIGURATION : OPTION BITS

There are two option bytes available (16 bits in all). These option bits are available from Service mode. First find the OPTION1/OPTION2/OPTION3 control, and then use the Volume PLUS/MINUS buttons on the remote control keypad to locate the bits, and OK key to toggle them. The table below shows the two option bytes available;

3.3.1 OPTION 1

	B7	B6	B5	B4	B3	B2	B1	B0
1	TOP Teletext OFF	FASTEXT (FLOF) OFF	TUBE 4:3	Headphone Volume/Balance control OFF	Dolby Virtual OFF	SVHS3 disabled	TUNER OPTIONS 00: Philips 01: Not used 10: Alps 11: Parstnic(DW)	
0	TOP Teletext ON	FASTEXT (FLOF) ON	TUBE 16:9	Headphone Volume/Balance control ON	Dolby Virtual ON	SVHS3 enabled		

3.3.2 OPTION 2

	B7	B6	B5	B4	B3	B2	B1	B0
1	Fixed to '0'	JVC remote control	AVL control OFF	PICTURE TILT ON	Program List Enabled	See later description under CONTROL DESCRIPTION.		
0		DAEWOO remote control	AVL control ON	PICTURE TILT OFF	Program List Disabled			

3.3.3 OPTION 3

	B7	B6	B5	B4	B3	B2	B1	B0
1	Must be set to "1" for future compatibility			Local Keyboard : 6 keys	Must be set to "1" for future compatibility (See CP830 NEC)	OSD display "AV" in extern mode	AV3 Enabled	Full ATSS
0				Local Keyboard : 5 keys	Program List Disabled	OSD display "EXT" in extern mode(JVC mode)	AV3 Disabled(NEC only)	Basic ATSS

Tube	Beam Current(mA)		B2	B1	B0
	Nominal	Max			
4/3 - Real Flat, 16/9 – Real Flat	1.30	1.45	1	1	0
	1.35	1.50	1	1	1

All values modified are immediately memorised in eeprom.

3.4 TV SET ALIGNMENT

3.4.1 LOCAL OSCILLATOR ALIGNMENT

Tune a colour bar pattern. The frequency of the signal carrier must be accurate (Max +/- 10KHz deviation from the nominal channel frequency).
Find AFT item in service mode.
Adjust the coil L150 to bring the cursor to central position : 32.

3.4.2 G2 ALIGNMENT

- Tune a colour bar pattern.
- Find the G2 - SCREEN item in service mode.
- Adjust screen volume (on FBT) to bring the cursor to central position : 32.

3.4.3 WHITE BALANCE

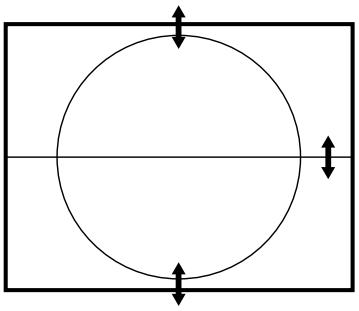
- Select a dark picture and adjust RED BIAS and GRN BIAS to the desired colour temperature.
- Select a bright picture and adjust RED, GRN and BLUE GAIN to the desired colour temperature.

3.4.4 FOCUS

Adjust the Focus volume (on FBT) to have the best resolution on screen.

3.4.5 VERTICAL GEOMETRY

Adjust V. LINEAR (linearity), S CORRECT (S. Correction), VERT SIZE (Vertical amplitude), VERT CENT (vertical centring) to compensate for vertical distortion.

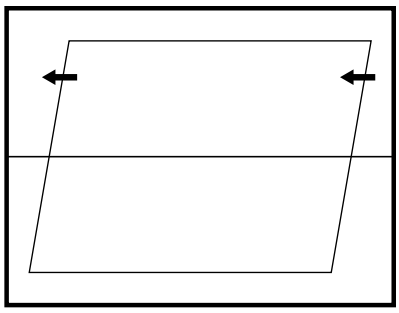


3.4.6 HORIZONTAL PICTURE CENTRING

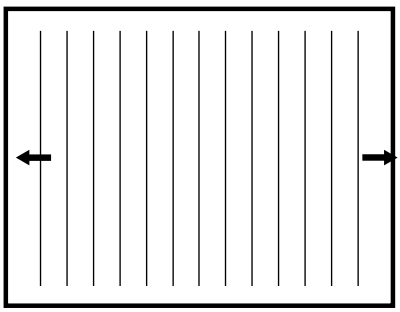
Adjust HOR CEN (Horizontal centre) to have the picture in the centre of the screen.

3.4.7 EAST / WEST CORRECTION

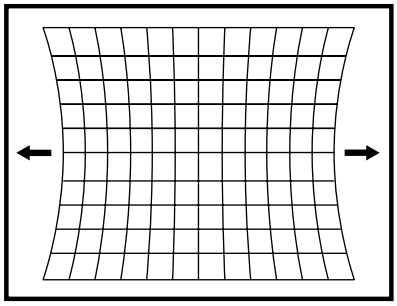
Adjust the PARABOLA, HOR WIDTH, CORNER, HOR PARAL, EW TRAPEZ, to compensate for geometrical distortion.



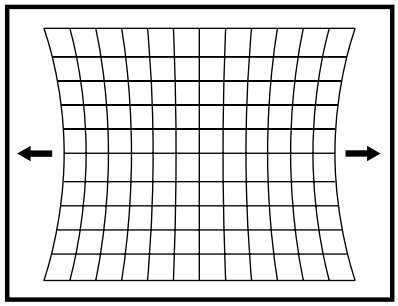
HOR PARAL



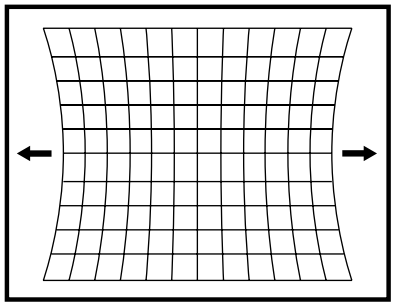
HOR WIDTH
adjust for 90% overscan.



PARABOLA



CORNER B & CORNER T



EW TRAPEZ

3.4.8 AGC

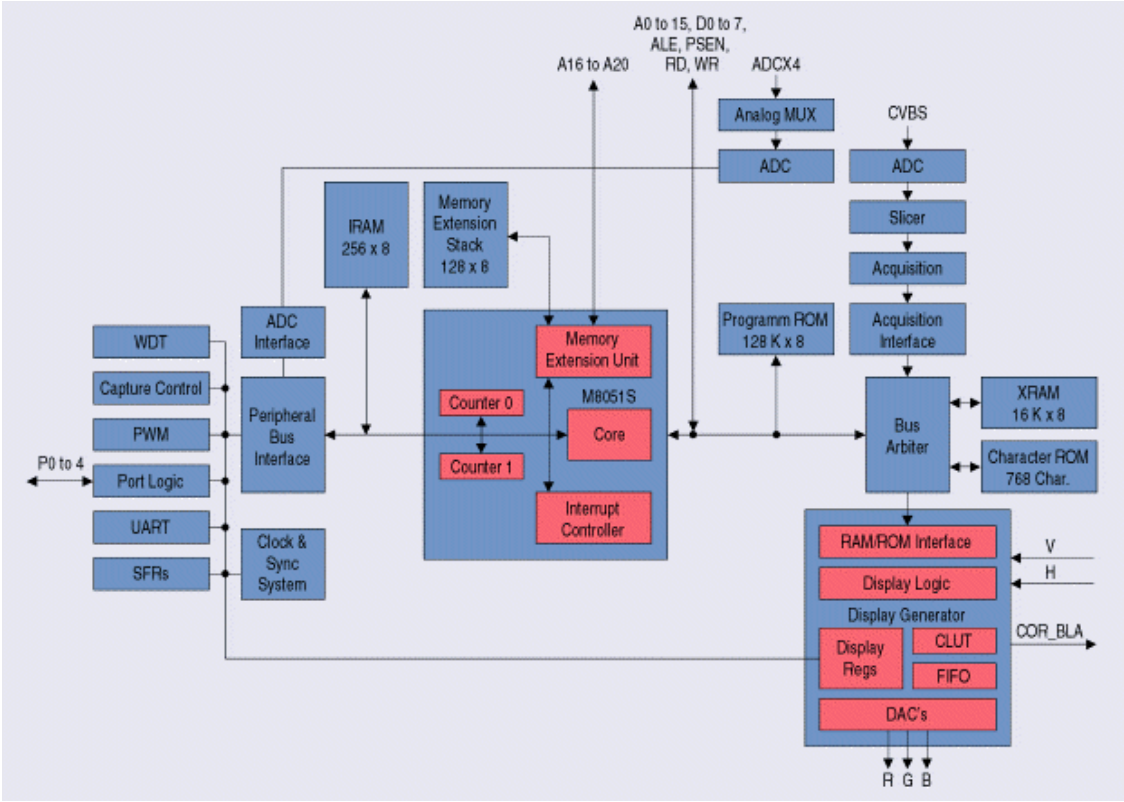
- Make sure option bits are correct for the tuner fitted on the chassis (See above how to change option bits).
- Adjust the antenna signal level at 62 dBμV± 2μV
- Tune a colour bar pattern.
- Find the “AGC” item in service mode.
- Press the key “OK” on the remote keypad and wait until AGC level stabilise to the optimum value.
- Alternatively, use “Vol Up/Dwn” keys to adjust manually to the desired Tuner Take Over Point (TOP).

4 IC DESCRIPTION

4.1 TELETEXT DECODER WITH EMBEDDED 8-BIT CONTROLLER

TVText Pro is a 8-bit controller based on a enhanced 8051 core with embedded teletext, On screen Display and TV controller functions.

4.1.1 BLOCK DIAGRAM OF THE SDA55XX



4.1.2

4.1.2 DESCRIPTION

The SDA 55xx is a single chip teletext decoder for decoding World System Teletext data as well as Video Programming System (VPS), Program Delivery Control (PDC), and Wide Screen Signalling (WSS) data used for PAL plus transmissions (line 23).

The device provides an integrated general-purpose, fully 8051-compatible Microcontroller with television specific hardware features. The microcontroller has been enhanced to provide powerful features such as memory banking, data pointers and additional interrupts etc.

The on-chip display unit for displaying Level 1.5 teletext data is also used for customer defined on-screen displays. Internal XRAM consists of 16 Kbytes. Device has an internal ROM of 128 Kbytes.

The SDA 55xx supports a wide range of standards including PAL, NTSC and contains a digital slicer for VPS, WSS, PDC, TTX and Closed Caption, an accelerating acquisition hardware module, a display generator for Level 1.5 TTX data and powerful On screen Display capabilities based on parallel attributes, and Pixel oriented characters (DRCS).

The 8-bit Microcontroller runs at 360 ns. cycle time (min.). Controller with dedicated hardware does most of the internal TTX acquisition processing, transfers data to/from external memory interface and receives/transmits data via I 2 C-firmware user-interface. The slicer combined with dedicated hardware stores TTX data in a VBI buffer of 1 Kilobyte. The Microcontroller firmware performs all the acquisition tasks (hamming-and parity-checks, page search and evaluation of header control bits) once per field. Additionally, the firmware can provide high-end Teletext-features like Packet-26-handling, FLOF, TOP and list-pages.

4.1.3 IC MARKING AND VERSION

Chassis	IC marking	OSD languages	ATSS countries	Text
CP-850/F		AUSTRALIA, BULGARIAN, CZECH, GERMAN, DANISH, SPANISH, FRENCH, FINNISH, GREEK, HUNGARIAN, ITALIAN, NORWEGIAN, DUTCH, POLISH, ROMANIAN, RUSSIAN, SWEDISH,	Australia, Austria, Belgium, Switzerland, Czech Republic, Germany, Denmark, Spain, France, Finland, GB, Greece, Hungary, Italy, Ireland, Norway, Netherlands, Portugal, Poland, Sweden, Others	PAN-EUROPEAN LATIN, CYRILLIC, GREEK.

4.1.4 PINNING

PSDIP 52-pin	Pin Name	Type	Short Description
1	SCL	IN/OUT	Software driven I2C bus Clock line
2	SDA	IN/OUT	Software driven I2C bus Data line
3	S/SW2	IN	Slow switching control for SCART 2.
4	S/SW2	IN	(See Microcontroller I/O pin configuration)
5	OCP	IN	Switch Off the set when the voltage goes below a trigger level
6	n.c.		
7	n.c.		
8	Reset Out	OUT	Driven by controlling software to reset video IC's.
9	VDD2.5	IN	Supply voltage 2.5V
10	VSS	IN	Ground (0V)
11	VDD3.3	IN	Input/Output 3.3V
12	CVBS	IN	CVBS input for the acquisition circuit
13	VDDA2.5	IN	Supply voltage for analog components
14	VSSA	IN	Ground for analog components
15	S/SW1	IN	Slow switching control for SCART 1.
16	AGC	IN	ADC input, for AGC alignment only
17	KEY	IN	ADC input, local key sensing
18	AFT	IN	ADC input, AFT input
19	HS	IN	Horizontal sync for OSD/Txt synchronisation
20	VS	IN	Vertical sync for OSD/Txt synchronisation
21	MODESW	OUT	High : Negative video modulation (B, G, D, K,I) Low : Positive video modulation (L / L')
22	L/L'	OUT	High : L', Low : L
23	IR	IN	Remote control signal input
24	INT	IN	Interrupt input from audio processor

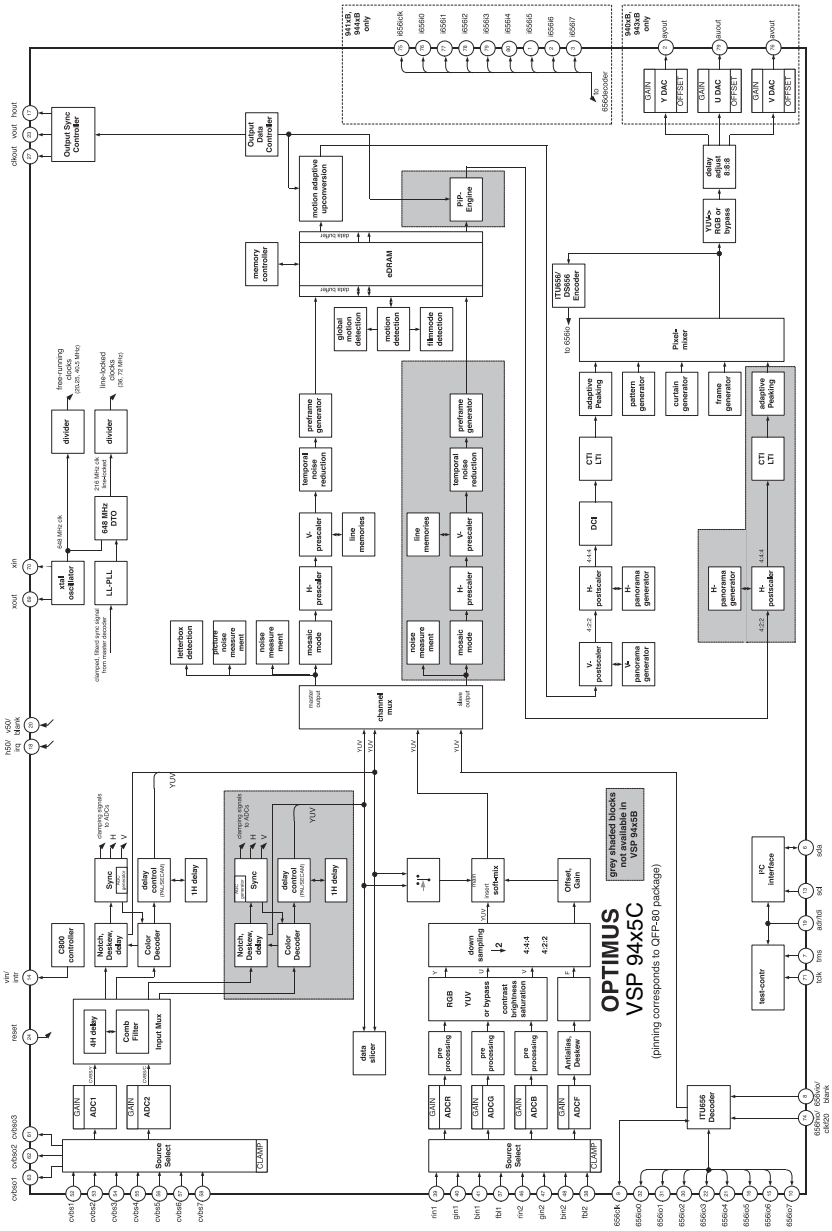
PSDIP 52-pin	Pin Name	Type	Short Description
25	PROJECT50		
26	n.c.		
27	n.c.		
28	n.c.		
29	VSS	IN	Ground (0V)
30	VDD3.3	IN	Input/Output 3.3V
31	n.c.		
32	n.c.		
33	RESET	IN	A low level on this pin resets the device.
34	XTAL2	OUT	Output of the inverting oscillator amplifier
35	XTAL1	IN	Input of the inverting oscillator amplifier
36	VSSA	IN	Ground for analog components
37	VDDA2.5	IN	Supply voltage for analog components
38	R OUT	OUT	Red output
39	G OUT	OUT	Green output
40	B OUT	OUT	Blue output
41	BK OUT	OUT	Blanking
42	VDD2.5	IN	Supply voltage 2.5V
43	VSS	IN	Ground (0V)
44	VDD3.3	IN	Input / Output 3.3V
45	n.c.		
46	n.c.		
47	n.c.		
48	AGC	OUT	Tuner TOP adjustment
49	FACTORY		
50	D/G COIL		
51	LED	OUT	High : Green LED, Low : Red LED
52	POWER	OUT	High : SMPS ON, Low : SMPS in stand by

4.2 VSP9405C - SCAN RATE CONVERTER INCLUDING MULTISTANDARD COLOUR DECODER

The VSP 94x5C comprises all main functions of a digital featurebox in one monolithic IC.

The device comprises a digital multistandard color decoder, a RGB interface with fast-blank capability (SCART), digital ITU656 input, scaling units including panorama, embedded DRAM for upconversion, picture improvements, temporal noise reduction as well as A/D and D/A converter.

4.2.1 BLOCK DIAGRAM OF THE VSP9405C



4.2.2 DESCRIPTION

- **Integrated Video Matrix switch**
  - Up to seven CVBS inputs, up to two Y/C inputs,
  - Up to three CVBS outputs (even when Y/C input)
  - 9 bit amplitude resolution for CVBS, Y/C A/D converter
  - AGC (Automatic Gain Control)

- **Multi-standard colour decoder**
  - PAL/NTSC/SECAM including all substandards
  - Automatic recognition of chroma standard
  - Only one crystal necessary for all standards
- **RGB-FBL or YUV-H-V input**
  - 8 bit amplitude resolution for RGB or YUV
  - 8 bit amplitude resolution for FBL or H
- **ITU656 support**
  - ITU656 output
  - DS656 output (double-scan '656like' output)
- **Noise reduction**
  - Motion adaptive temporal noise reduction
  - Field-based temporal noise reduction for luminance and chrominance
  - Different motion detectors for luminance and chrominance or identical
  - Flexible programming of the temporal noise reduction parameters
  - Automatic measurement of the noise level
- **Horizontal scaling of the 1fH signal**
  - Split-screen possible with additional PiP or Text processor
- **Flexible digital horizontal scaling of the 2fH signal (Not used in this chassis)**
  - Scaling factors: 3, ... [2 pixel resolution], ..., 0.75 including 16:9 compatibility
  - 5 zone panorama generator
- **Embedded memory**
  - On-chip memory controller
  - Embedded DRAM core for field memory
  - SRAM for PAL/SECAM delay line
- **Data format 4:2:2**
- **Flexible clock and synchronisation concept**
  - Horizontal line-locked or free-running mode
  - Vertical locked or free-running mode
- **Scan-rate-conversion**
  - Simple interlaced modes (100/120 Hz): AABB, AAAA, BBBB (9402A/9412A only)
- **Flexible output sync controller**
  - Flexible positioning of the output signal
  - Flexible programming of the output sync raster
  - 'Blank signal' generation
- **Signal manipulations**
  - Still field
  - Insertion of coloured background
  - Windowing
  - Vertical chrominance shift for improved VCR picture quality
- **Sharpness improvement (not used in this chassis)**
  - Digital color transition improvement (DCTI)
  - Peaking (luminance)
- **1920 active pixel/per line in default configuration**
- **I^2C-bus control (400 kHz)**
  - selectable I^2C address
- **1.8V ± 5% and 3.3V ± 5% supply voltages**
- **P-MQFP-80 package**

4.2.3 PINNING

Pin Connections and Short Descriptions for VSPB

For VSP 941x/4x, the pin connections differ for pins: 1, 2, 3, 75, 76, 77, 78, 79, 80 (see Section 4.2.2. on page 210).

Common Pin Connections and Short Descriptions

Pin No.		Pin Name	Type	Connection (If not used)	Short Description
MQFP 80-pin	MQFP 144-pin				
1	1	VDDDACY	S/I		DAC (Y)
2		AYOUT	O/I		Y output
3	3	VSSDACY	S/I		DAC (Y)
4	4	VSSD2	S		Supply voltage for digital (0 V digital)
5	5	VDDD2	S		Supply voltage for digital (1.8 V digital)
6	10	SDA	I/O		I^2C-Bus data
7	13	TMS	I		Testmode select (Connected to vdd33)
8	14	656VIN/BLANK	I/O	Connect to vss and disable blank	Separate V input for 656 / BLANK output
9	15	656CLK	I/O	Leave open	Digital input / output clock
10	16	656IO7	I/O	Leave open	Digital input / output (MSB)
11	19	VSSP2	S		Supply voltage for digital (0 V pad)
12	20	VDDP2	S		Supply voltage for digital (3.3 V pad)
13	28	SCL	I		I^2C-Bus clk
14	29	V/INT	I	Connect to vss	Vertical pulse for RGB input
15	30	656IO6	I/O	Leave open	Digital input / output
16	31	656IO5	I/O	Leave open	Digital input / output
17	32	HOUT	O	Leave open	Horizontal output (Single or double scan, dependent on version)
18	33	H50/IRQ	O	Leave open	Hout 50 Hz (with skew)
19	34	ADR / TDI	I		I^2C address / test data in
20	35	V50/BLANK	O	Leave open	Vout 50 Hz
21	37	656IO4	I/O	Leave open	Digital input / output
22	38	656IO3	I/O	Leave open	Digital input / output
23	39	VOUT	O	Leave open	Vertical output (Single or double scan, dependent on version)
24	40	RESET	I		Reset input (Reset when low)
25	41	VDDP3	S		Supply voltage for digital (0 V pad)

Pin No. MQFP 80-pin	Pin No. MQFP 144-pin	Pin Name	Type	Connection (If not used)	Short Description
26	42	VSSP3	S		Supply voltage for digital (3.3 V pad)
27	51	CLKOUT	O	Leave open	Output clock (27 MHz nom.)
28	58	VDDD3	S		Supply voltage for DRAM (1.8 V digital)
29	59	VSSD3	S		Supply voltage for digital (0 V digital)
30	60	656IO2	I/O	Leave open	Digital input / output
31	61	656IO1	I/O	Leave open	Digital input / output
32	62	656IO0	I/O	Leave open	Digital input / output (LSB)
33	63	VSSD4	S		Supply voltage for digital (0 V digital)
34	64	VDDD4	S		Supply voltage for digital 1.8 V digital
35	65	VDDAFBL	S		Supply voltage for FBL (1.8 V)
36	66	VSSAFBL	S		Supply voltage for FBL (0 V)
37	67	FBL1	I	Connect to vss	Fast Blank input 1 (H1) (Analog input)
38	68	FBL2	I	Connect to vss	Fast Blank input 2 (H2) (Analog input)
39	70	RIN1	I	Connect to vss	R or V in1 (Analog input)
40	72	GIN1	I	Connect to vss	G or Y in1 (Analog input)
41	73	BIN1	I	Connect to vss	B of U in1 (Analog input)
42	74	VDDARGB	S		Supply voltage for RGB (1.8 V)
43	75	VSSARGB	S		Supply voltage for RGB (0 V)
44	76	VDD33RGB	S		Supply voltage RGB (3.3 V)
45	77	VSS33RGB	S		Supply voltage RGB (0 V)
46	78	RIN2	I	Connect to vss	R or V in2 (Analog input)
47	80	GIN2	I	Connect to vss	G or Y in2 (Analog input)
48	82	BIN2	I	Connect to vss	B of U in2 (Analog inpu)
49	89	VSSD5[1)]	S	Connect to vss	Supply voltage for digital (0 V)
50	92	VDDAC1	S		Supply voltage CVBS1 (1.8 V)
51	93	VSSAC1	S		Supply voltage CVBS1 (0 V)
52	96	CVBS1	I	Connect to vss	CVBS input (Analog input)
53	97	CVBS2	I	Connect to vss	CVBS input (Analog input)
54	98	CVBS3	I	Connect to vss	CVBS input (Analog input)
55	100	CVBS4	I	Connect to vss	CVBS input or Y1 (Analog input)
56	102	CVBS5	I	Connect to vss	CVBS input or C1 (Analog input)

Pin No. MQFP 80-pin	Pin No. MQFP 144-pin	Pin Name	Type	Connection (If not used)	Short Description
57	104	CVBS6	I	Connect to vss	CVBS input or Y2 (Analog input)
58	106	CVBS7	I	Connect to vss	CVBS input or C2 (Analog input)
	94	CVBS8	I	Connect to vss	CVBS input (Analog input)
	95	CVBS9	I	Connect to vss	CVBS input (Analog input)
59	107	VDD33C	S		Supply voltage CVBS (3.3 V)
60	108	VSS33C	S		Supply voltage CVBS (0 V)
61	111	CVBSO3	O	Leave open	CVBS output 3 (Analog output)
62	110	CVBSO2	O	Leave open	CVBS output 2 (Analog output)
63	109	CVBSO1	O	Leave open	CVBS output 1 (Analog output
64	112	VDDAC2	S		Supply voltage CVBS2 (1.8 V)
65	113	VSSAC2	S		Supply voltage CVBS2 (0 V)
66	117	VDDD1	S		Supply voltage for digital (1.8 V digital)
67	118	VSSD1	S		Supply voltage for digital (0 V digital)
68	119	VDDAPLL	S		Supply voltage for PLL (1.8 V)
69	122	XOUT	O		Crystal connection 2
70	123	XIN	I		Crystal connection 1
71	129	TCLK	I		Testclock
72	130	VDDP1	S		Supply voltage for digital (3.3 V pad)
73	131	VSSP1	S		Supply voltage for digital (0 V pad)
74	138	656HIN/CLKF20	I/O	Connect to vss and disable clock	Separate H input for 656 / 20.25 clock output
75	139	VDDDACV	S/I	Leave open	DAC (V) (27 MHz nom.)
76	140	AVOUT	O/I	Leave open	V output
77	141	VSSDACV	S/I	Leave open	DAC (V)
78	142	VDDDACU	S/I		DAC (U)
79	143	AUOUT	O/I		U output
80	144	VSSDACU	S/I		DAC (U)
	11	VDDP4			Supply voltage for digital (3.3 V)
	12	VSSP4			Supply voltage for digital (0 V)
	36	VSSPDB1			Bulk supply voltage (0 V)
	50	VSSP3			Supply voltage for digital (0 V)

Pin No. MQFP 80-pin	Pin No. MQFP 144-pin	Pin Name	Type	Connection (If not used)	Short Description
	55	VDDP5			Supply voltage for digital (3.3 V)
	56	VSSP5			Supply voltage for digital (0 V)
	86	VDDPOR			Supply voltage for digital (1.8 V)
	87	VDDP6			Supply voltage for digital (3.3 V)
	88	VSSP6			Supply voltage for digital (0 V)
	120	VSSP7			Supply voltage for digital (0 V)
	121	VDDP7			Supply voltage for digital (3.3 V)
	134	VSSP8			Supply voltage for digital (0 V)
	135	VDDP8			Supply voltage for digital (3.3 V)
	17	(reserved)		Leave open	(Reserved)
	57	(reserved)		Leave open	(Reserved)
	83	(reserved)		Leave open	(Reserved)
	84	(reserved)		Leave open	(Reserved)
	85	(reserved)		Leave open	(Reserved)
	133	(reserved)		Leave open	(Reserved)
	136	(reserved)		Leave open	(Reserved)
	137	(reserved)		Leave open	(Reserved)
	69	(NC)			(Not connected)
	71	(NC)			(Not connected)
	79	(NC)			(Not connected)
	81	(NC)			(Not connected)
	99	(NC)			(Not connected)
	101	(NC)			(Not connected)
	103	(NC)			(Not connected)
	105	(NC)			(Not connected)
	54	DROUT0	O	Leave open	Digital out red
	53	DROUT1	O	Leave open	Digital out red
	52	DROUT2	O	Leave open	Digital out red
	48	DROUT3	O	Leave open	Digital out red
	47	DROUT4	O	Leave open	Digital out red
	46	DROUT5	O	Leave open	Digital out red

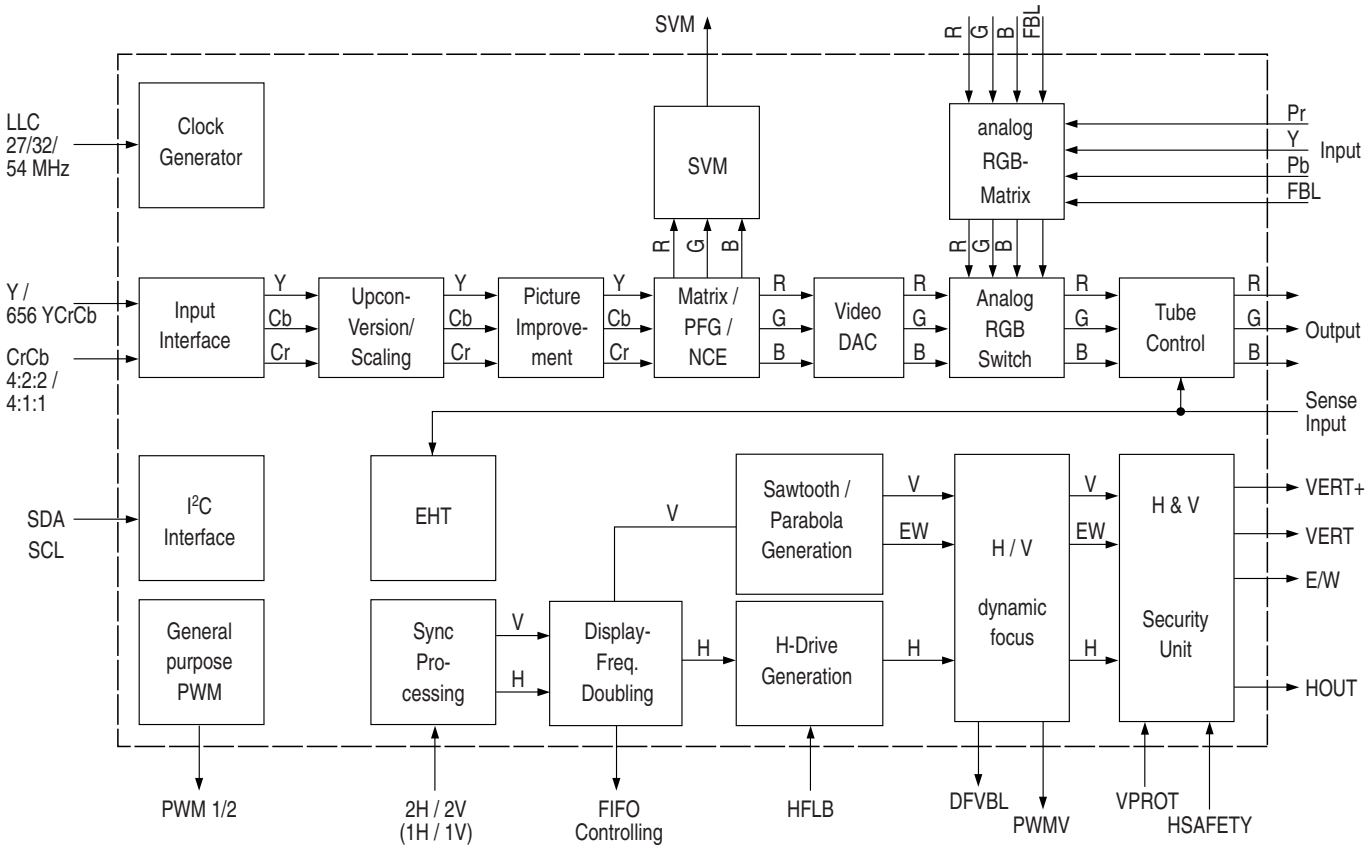
Pin No. MQFP 80-pin	Pin No. MQFP 144-pin	Pin Name	Type	Connection (If not used)	Short Description
	45	DROUT6	O	Leave open	Digital out red
	44	DROUT7	O	Leave open	Digital out red
	43	DROUT8	O	Leave open	Digital out red
	25	DGOUT0	O	Leave open	Digital out green/656out0
	24	DGOUT1	O	Leave open	Digital out green/656out1
	23	DGOUT2	O	Leave open	Digital out green/656out2
	22	DGOUT3	O	Leave open	Digital out green/656out3
	21	DGOUT4	O	Leave open	Digital out green/656out4
	9	DGOUT5	O	Leave open	Digital out green/656out5
	8	DGOUT6	O	Leave open	Digital out green/656out6
	7	DGOUT7	O	Leave open	Digital out green/656out7
	6	DGOUT8	O	Leave open	Digital out green
	132	DBOUT0	O	Leave open	Digital out blue
	128	DBOUT1	O	Leave open	Digital out blue
	127	DBOUT2	O	Leave open	Digital out blue
	126	DBOUT3	O	Leave open	Digital out blue
	125	DBOUT4	O	Leave open	Digital out blue
	124	DBOUT5	O	Leave open	Digital out blue
	116	DBOUT6	O	Leave open	Digital out blue
	115	DBOUT7	O	Leave open	Digital out blue
	114	DBOUT8	O	Leave open	Digital out blue
	91	SISCEN	I		Single-scan enable
	18	TDO	O	Leave open	Test data out

[1)] This pin is not used and not bonded in VSP 94x2A.
All VDDPx, VSSx and VDDDx must be connected within their group with low resistance.

4.3 DDP 3315C - DISPLAY AND DEFLECTION PROCESSOR

The DDP 3315C is a mixed-signal single-chip digital display and deflection processor, designed for high-quality backend applications in double scan and HDTV TV sets with 4:3 or 16:9 picture tubes. The interfaces qualify the IC to be combined with state of the art digital scan rate converters, as well as analog HDTV sources. The DDP 3315C contains the entire digital video component, deflection processing, and all analog interfaces to display the picture on a CRT.

4.3.1 BLOCK DIAGRAM OF THE DDP 3315C



4.3.2 DESCRIPTION

Video Processing

- linear horizontal scaling (0.25 ... 4), as well as nonlinear horizontal scaling “panorama vision”
- dynamic black level expander
- luma sharpness enhancement by dynamic peaking and luma transient improvement (LTI)
- color transient improvement (CTI)
- programmable RGB matrix
- black stretch, blue stretch, gamma correction via programmable Non-linear Colorspace Enhancer (NCE) on RGB
- two analog double scan inputs with fast blank (one RGB and one RGB/YC r C b /YP r P b selectable)
- average and peak beam current limiter
- automatic picture tube adjustment (cutoff, drive)
- histogram calculation

Deflection Processing

- scan velocity modulation output
- digital EHT compensation for vertical / east-west
- soft start/stop of horizontal-drive
- vertical angle and bow correction
- differential vertical outputs
- vertical zoom via deflection adjustment
- horizontal and vertical protection circuit
- horizontal frequency for VGA/SVGA/1080I
- black switch off procedure
- supports horizontal and vertical dynamic focus

Miscellaneous

- selectable ITU-R 601 4:1:1 / 4:2:2 YC r C b input at 27/32 MHz or double scan ITU-R 656 input at 54 MHz line-locked clock
- crystal oscillator for horizontal safety
- picture frame generator
- hardware for simple 50/60 Hz to 100/120 Hz conversion (display frequency doubling)
- PQFP80 package, 5 V analog and 3.3 V digital supply

IC architecture

A clock generator converts different external line locked clock rates to a common internal sample rate of ~40 MHz, in order to provide a higher horizontal resolution. The input interface accepts ITU-R 601 at 27 or 32 MHz and ITU-R 656 with encoded or external sync at 54 MHz. The horizontal scaler is used for the scan rate conversion and for the nonlinear aspect ratio conversion as well.

For the picture improvement, luma and chroma are processed separately. The luminance contrast ratio can be extended with a dynamic black level expander. In addition the frequency characteristic is improved by a transient improvement (LTI) and an adaptive dynamic peaking circuit. The peaking adapts to small AC amplitudes of high frequency parts, while large AC amplitudes are processed by the LTI. The chroma signal is enhanced with a transient improvement (CTI) with proper limitation to avoid wrong colours. The full programmable RGB matrix covers control of colour saturation and temperature. A digital white drive control is used to adjust the white balance and for the beam current limitation to prevent the CRT from over-load. A non-linear colorspace enhancer (NCE) for RGB gives full flexibility for any amplitude characteristic. High speed10-bit D/A converters are used to convert digital RGB to analog signals. Separate 9-bit D/A converters control brightness and cutoff. For picture tubes equipped with an appropriate yoke a scan velocity modulation (SVM) signal is calculated using a differentiated luminance signal.Two analog sources can be inserted in the main RGB, controlled by separate fastblank (FBL) signals. Contrast and brightness are adjusted separately from main RGB. One input is dedicated to RGB for on screen display (OSD). The second input is processed with an analog RGB matrix to insert YCbCr/YpbPr or RGB with control of colour saturation and programmable half contrast. The bandwidth of ~30MHz guarantees pixel based graphics to be displayed with full accuracy. All previously mentioned features are implemented in dedicated hardware. An integrated processor controls the horizontal and vertical deflection, tube measurement loops and beam current limitation. It is also used to calculate an amplitude histogram of the displayed image.

The horizontal deflection is synchronized with two numeric phase-locked loops (PLL) to the incoming sync. One PLL generates the horizontal timing signals, e.g. blanking and key-clamping. The second PLL adjusts the phase of the horizontal drive pulse with a subpixel accuracy less than 1 ns.

Vertical deflection and east/west correction waveforms are calculated as 6th order polynomials. This allows adjustment of an east/west parabola with trapezoidal, pincushion and an upper/lower corner correction (even for real flat CRT's), as well as a vertical sawtooth with linearity and S-correction. Scaling both waveforms, and limiting to fix amplitudes, performs a vertical zoom or compression of the displayed image. A field and line frequent control loop compensates picture content depending EHT distortions.

4.3.3 PINNING

Pin No.	Pin Name	I/O	Description	Remarks
1	Y6	I	Picture bus Luma	
2	Y7	I	Picture bus Luma (MSB)	
3	656EN	I	Enable 656 input mode	
4	LLC2	I	System clock input	
5	HS	I	Horizontal Sync Input	
6	VS	I	Vertical Sync Input	
7	FREQSEL	I	Selection of H-Drive Frequency Range	
8	CM1	I	Clock select 1	
9	CM0	I	Clock select 0	
10	VS2	I	Additionnal VSYNC input	
11	XTAL2	O	Analog Crystal Output	
12	XTAL1	I	Analog Crystal Input	
13	NC			
14	GNDP	S	Ground, Output Pin Driver	
15	VSUPP	S	Supply voltage, Output Pin Driver	
16	FIFORRD	O	FIFO Read Counter Reset	
17	FIFORD	O	FIFO Read Enable	
18	FIFOWR	O	FIFO Write Enable	
19	FIFORWR	O	FIFO Write Counter Reset	
20	PWM1	O	I2C controlled DAC	
21	PWM2	O	I2C controlled DAC / Tilt output	
22	PWMV	O	I2C controlled DAC	
23	HOUT	O	Horizontal drive output	
24	VSTBY	S	Standby supply voltage, Hout generation	
25	DFVBL	O	Dynamic focus blanking / horizontal DAF	
			pulse	
26	HSYNC	O	Horizontal sync output	
27	VSYNC	O	Vertical sync output	
28	NC			
29	ASG1	S	Analog Shield Ground	
30	HFBL	I	Horizontal flyback input	
31	SAFETY	I	Safety input	
32	VPROT	I	Vertical protection input	
33	RSW2	O	Range Switch2, measurement ADC	
34	RSW1	I/O	Range Switch1, measurement ADC	
35	SENSE	I	Sense ADC input	
36	GNDM	S	Ground, MADC input	
37	VERT+	O	Differential Vertical Sawtooth Output	
38	VERT-	O	Differential Vertical Sawtooth Output	
39	EW	O	East / West Correction Output	

Pin No.	Pin Name	I/O	Description	Remarks
40	NC			
41	SVM	O	Scan Velocity Modulator	
42	ROUT	O	Analog Output Red	
43	GOUT	O	Analog Output Green	
44	BUT	O	Analog Output Blue	
45	GNDO	S	Ground, analog Back End	
46	XREF	I	Reference Input for RGB DAC's	
47	VSUPO	S	Supply voltage, Analog Back End	
48	VRD/BCS	I	DAC Reference, Beam current safety	
49	AGND	S	Analog Ground for Analog Matrix	
50	FBLIN1	I	Fast Blank1input	
51	RIN1	I	Analog Red1input	
52	GIN1	I	Analog Green1 input	
53	BIN1	I	Analog Blue1input	
54	FBLIN2	I	Fast Blank2 input	
55	RIN2 / PR	I	Analog Red2 input / PR Input	
56	GIN2 / Y	I	Analog Green2 input / Y Input	
57	BIN2/ PB	I	Analog Blue2 input / PB Input	
58	ASG2	S	Analog Shield Ground	
59	HCS	I	Half Contrast	
60	NC			
61	TEST	I		
62	RESQ	I	Reset Input, active low	
63	SCL	I/O	I2C Bus clock	
64	SDA	I/O	I2C Bus data	
65	C0	I	Picture Bus Chroma (LSB)	
66	C1	I	Picture Bus Chroma	
67	C2	I	Picture Bus Chroma	
68	C3	I	Picture Bus Chroma	
69	C4	I	Picture Bus Chroma	
70	C5	I	Picture Bus Chroma	
71	C6	I	Picture Bus Chroma	
72	C7	I	Picture Bus Chroma (MSB)	
73	VSUPD	S	Supply voltage, Digital Circuitry	
74	GNDD	S	Ground, Digital Circuitry	
75	Y0	I	Picture Bus Luma (LSB)	
76	Y1	I	Picture Bus Luma	
77	Y2	I	Picture Bus Luma	
78	Y3	I	Picture Bus Luma	
79	Y4	I	Picture Bus Luma	
80	Y5	I	Picture Bus Luma	

4.4 MSP341X MULTISTANDARD SOUND PROCESSOR

The MSP 341x is designed as a single-chip Multistandard Sound Processor for applications in analogue and digital TV sets, video recorders, and PC cards.

The MSP3411 has all functions of MSP3410 with the addition of a virtual surround sound features.
Surround sound can be reproduced to a certain extent with two loudspeakers. The MSP3411 includes virtualizer algorithm "3D Panorama" which has been approved by the Dolby laboratories for compliance with the "Virtual Dolby Surround" technology. In addition, the MSP3411 includes Micronas "Panorama" algorithm.

MSP 341x features:

- sound IF input
- No external filters required
- Stereo baseband input via integrated AD converters
- Two pairs of DA converters
- Two carrier FM or NICAM processing
- AVC : Automatic Volume Correction
- Bass, treble, volume processing
- Full SCART in/out matrix without restrictions
- Improved FM-identification
- Demodulator short programming
- Auto-detection for terrestrial TV - sound standards
- Precise bit-error rate indication
- Automatic switching from NICAM to FM/AM or vice versa
- Improved NICAM synchronisation algorithm
- Improved carrier mute algorithm
- Improved AM-demodulation
- Reduction of necessary controlling
- Less external components

4.4.1 BASIC FEATURES OF THE MSP 341X

4.4.1.1 Demodulator & NICAM Decoder Section

The MSP 341x is designed to simultaneously perform digital demodulation and decoding of NICAM-coded TV stereo sound, as well as demodulation of FM or AM mono TV sound. Alternatively, two carrier FM systems according to the German terrestrial specs can be processed with the MSP 341x.

The MSP 341x facilitates profitable multistandard capability, offering the following advantages:

- Automatic Gain Control (AGC) for analogue input: input range: 0.10 - 3 Vpp
- integrated A/D converter for sound-IF input
- all demodulation and filtering is performed on chip and is individually programmable
- easy realisation of all digital NICAM standards (B/G, I, L and D/K)
- FM-demodulation of all terrestrial standards (include identification decoding)
- no external filter hardware is required
- only one crystal clock (18.432 MHz) is necessary
- high deviation FM-mono mode (max. deviation: approx. ±360 kHz)

4.4.1.2 DSP-Section (Audio Baseband Processing)

- flexible selection of audio sources to be processed
- performance of terrestrial de-emphasise systems (FM, NICAM)
- digitally performed FM-identification decoding and de-matrixing
- digital baseband processing: volume, bass, treble
- simple controlling of volume, bass, treble

4.4.1.3 Analogue Section

- two selectable analogue pairs of audio baseband input (= two SCART inputs) input level: <2 V RMS, input impedance: >25 $K\Omega$
- one selectable analogue mono input (i.e. AM sound): Not used in this chassis
- two high-quality A/D converters, S/N-Ratio: >85 dB
- 20 Hz to 20 kHz bandwidth for SCART-to-SCART copy facilities
- loudspeaker: one pair of four-fold oversampled D/A converters. Output level per channel: max. 1.4 VRMS output resistance: max. 5 k Ω. S/N-ratio: >85 dB at maximum volume max. noise voltage in mute mode: < 10 μV (BW: 20 Hz... 16 kHz)
- one pair of four-fold oversampled D/A converters supplying a pair of SCART-outputs. Output level per channel: max. 2 V RMS, output resistance: max. 0.5 k Ω, S/N-Ratio: >85 dB (20 Hz... 16 kHz)

4.4.1.4 NICAM & FM/AM-Mono

According to the British, Scandinavian, Spanish, and French TV-standards, high-quality stereo sound is transmitted digitally. The systems allow two high-quality digital sound channels to be added to the already existing FM/AM-channel. The sound coding follows the format of the socalled Near Instantaneous Companding System (NICAM 728). Transmission is performed using Differential Quadrature Phase Shift Keying (DQPSK. Table below offers an overview of the modulation parameters.

In the case of NICAM/FM (AM) mode, there are three different audio channels available: NICAM A, NICAM B, and FM/AM-mono. NICAM A and B may belong either to a stereo or to a dual language transmission. Information about operation mode and about the quality of the NICAM signal can be read by the controlling software via the control bus. In the case of low quality (high bit error rate), the controlling software may decide to switch to the analogue FM/AM-mono sound.

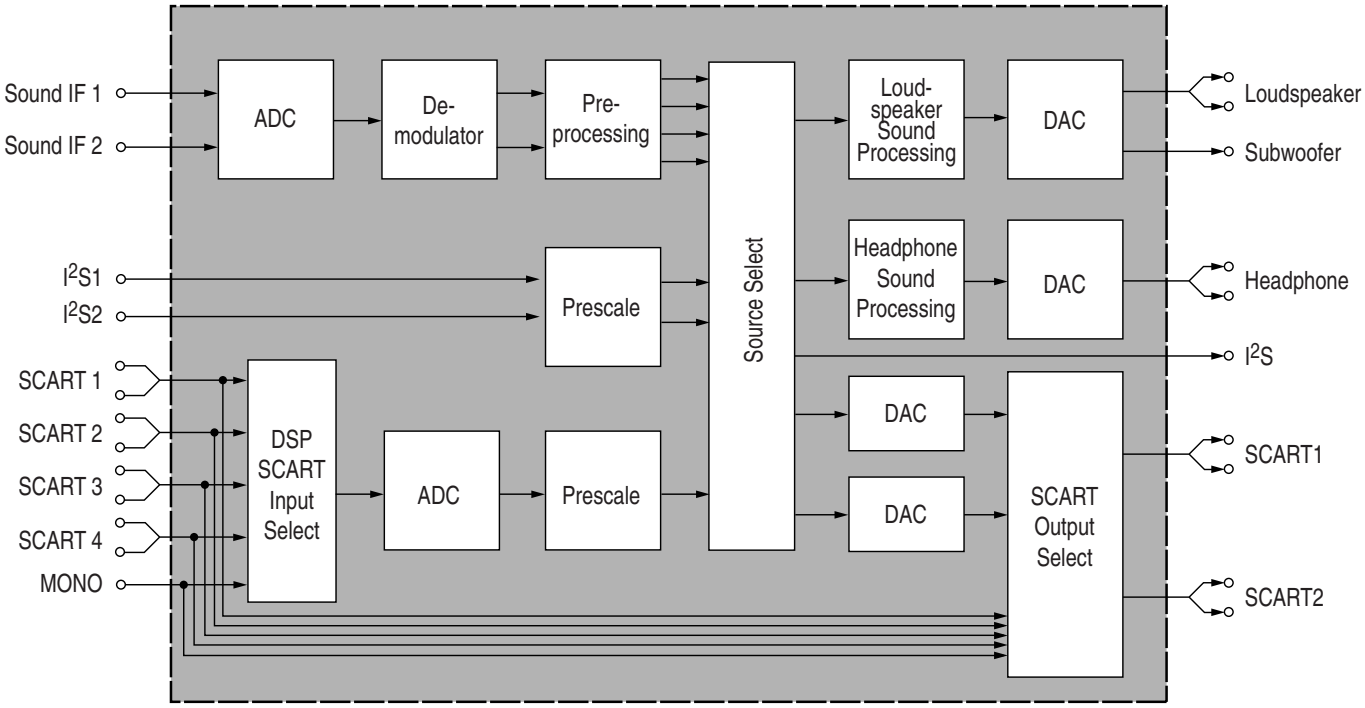
Alternatively, an automatic NICAM-FM/AM switching may be applied.

4.4.1.5 German 2-Carrier System (DUAL FM System)

Since September 1981, stereo and dual sound programs have been transmitted in Germany using the 2-carrier system. Sound transmission consists of the already existing first sound carrier and a second sound carrier additionally containing an identification signal. More details of this standard are given in Tables below. For D/K very similar system is used.

TV standards

TV system	Position of sound carrier (MHz)	Sound modulation	Colour system	Country
B/G	5.5 / 5.7421875	FM Stereo	PAL	GERMANY
B/G	5.5 / 5.85	FM-Mono / NICAM	PAL	Scandinavia,
				Spain
L	6.5 / 5.85	AM - Mono / NICAM	SECAM-L	France
I	6.0 / 6.552	FM-Mono / NICAM	PAL	UK
D/K	6.5 / 6.2578125 D/K1	FM Stereo	SECAM-	USSR
	6.5 / 6.7421875 D/K2	FM-Mono / NICAM	East	Hungary
	6.5 / 5.85 D/K-NICAM			
B	5.5	FM Stereo	PAL	AUSTRALIA



Architecture of MSP341x

Pin connections and short description

Pin No.	Pin Name	Type	Short description
1	NC		Not Connected
2	NC		Not Connected
3	NC		Not Connected
4	INT	Out	Interrupt out
5	MUTE	Out	Mute out
6	ADR_SEL	In	I2C bus Address select
7	STANDBYQ	In	Standby (Low-active)
8	NC		Not Connected
9	I2C_CL	In / Out	I2C Clock
10	I2C_DA	In / Out	I2C data
11	NC		Not Connected
12	NC		Not Connected
13	NC		Not Connected
14	NC		Not Connected
15	NC		Not Connected
16	NC		Not Connected
17	NC		Not Connected
18	DVSUP		Digital power supply +5V
19	DVSS		Digital Ground
20	NC		Not Connected
21	NC		Not Connected

Pin No.	Pin Name	Type	Short description
22	NC		Not Connected
23	NC		Not Connected
24	RESETQ	In	Power-On-reset
25	DACA_R	Out	Headphone out right
26	DACA_L	Out	Headphone out left
27	VREF2		Reference ground 2 high voltage part
28	DACM_R	Out	Loudspeaker out Right
29	DACM_L	Out	Loudspeaker out Left
30	NC		Not Connected
31	NC		Not Connected
32	NC		Not Connected
33	SC2_OUT_R	Out	Scart output 2 right
34	SC2_OUT_L	Out	Scart output 2 left
35	VREF1		Reference ground 1 high voltage part
36	SC1_OUT_R	Out	Scart output 1, right
37	SC1_OUT_L	Out	Scart output 1, left
38	CAPL_A		Volume capacitor AUX
39	AHVSUP		Analog power supply 8.0V
40	CAPL_M		Volume capacitor MAIN
41	AHVSS		Analog ground
42	AGNDC		Analog reference voltage high voltage part
43	NC		Not Connected
44	NC		Not Connected
45	NC		Not Connected
46	SC3_IN_L	In	Scart input 3 in, left
47	SC3_IN_R	In	Scart input 3 in, right
48	ASG2		Analog Shield Ground 2
49	SC2_IN_L	In	Scart input 2 in, left
50	SC2_IN_R	In	Scart input 2 in, right
51	ASG1		Analog Shield Ground 1
52	SC1_IN_L	In	Scart input 1 in, left
53	SC1_IN_R	In	Scart input 1 in, right
54	VREFTOP		Reference voltage IF A/D converter
55	MONO_IN	In	Mono input
56	AVSS		Analog ground
57	AVSUP		Analog power supply
58	ANA_IN1+	In	IF input 1
59	ANA_IN1-	In	IF common
60	NC		Not Connected
61	TESTEN	In	Test pin
62	XTAL_IN	In	Crystal oscillator
63	XTAL_OUT	Out	Crystal oscillator
64	NC		Test pin

4.5 TDA4470 - MULTISTANDARD VIDEO-IF AND QUASI PARALLEL SOUND PROCESSOR

4.5.1 DESCRIPTION

The TDA4470 is an integrated bipolar circuit for multi-standard video/sound IF (VIF/SIF) signal processing in TV/VCR and multimedia applications. The circuit processes all TV video IF signals with negative modulation (e.g., B/G standard), positive modulation (e.g., L standard) and the AM, FM/NICAM sound IF signals.

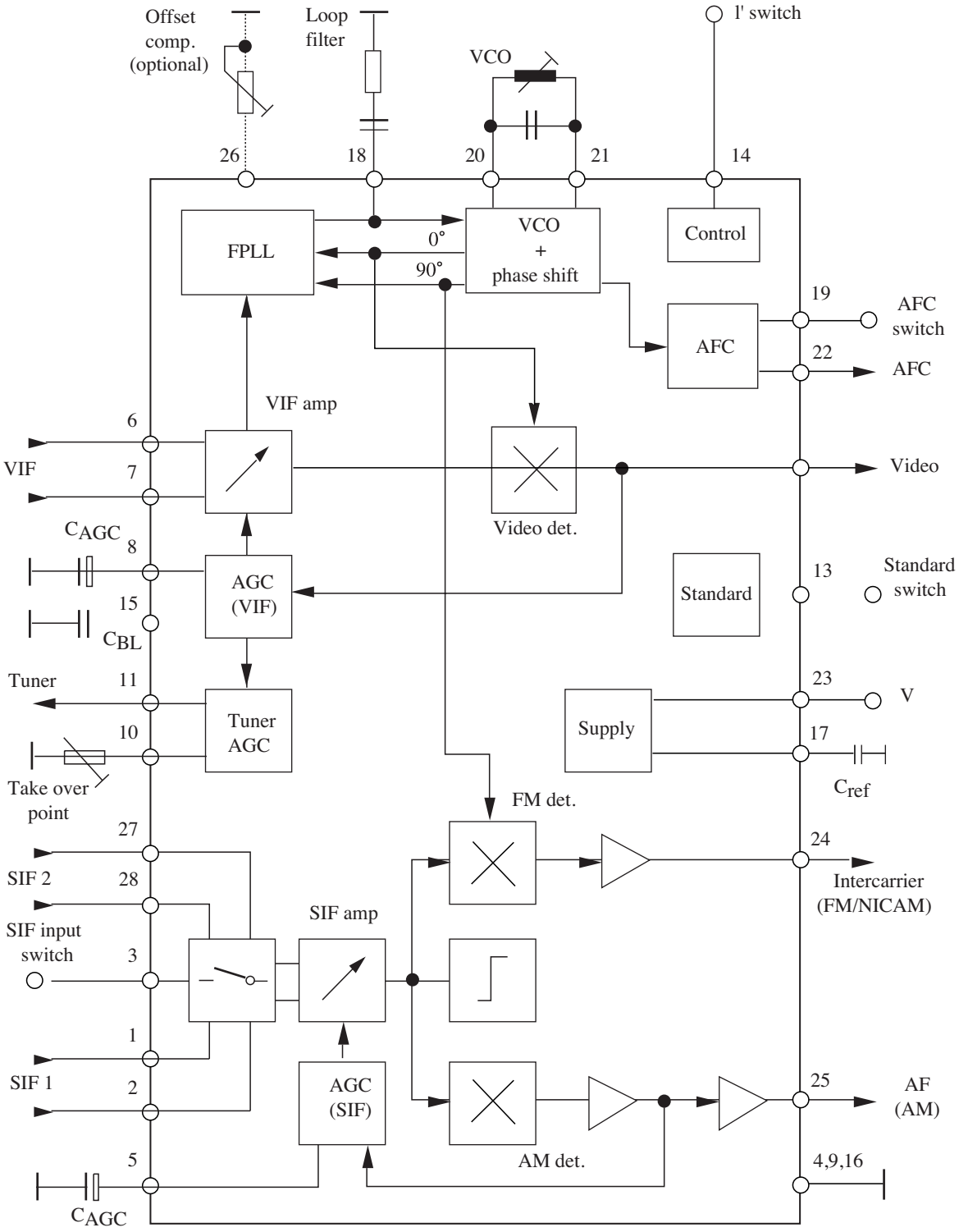
4.5.2 FEATURES

- 5 V supply voltage; low power consumption.
- Active carrier generation by FPLL principle (frequency-phase-locked-loop) for true synchronous demodulation.
- Very linear video demodulation, good pulse response and excellent intermodulation figures.
- VCO circuit operates at picture carrier frequency, the VCO frequency is switchable for L'-mode
- Alignment-free AFC without external reference circuit, polarity of the AFC curve is switchable.
- VIF-AGC for negative modulated signals (peak sync. detection) and for positive modulation (peak white/black level detector).
- Tuner AGC with adjustable take over point.
- Alignment-free quasi parallel sound (QPS) mixer for FM/NICAM sound IF signals.
- Intercarrier output signal is gain controlled (necessary for digital sound processing).
- Complete alignment-free AM demodulator with gain controlled AF output.
- Separate SIF-AGC with average detection
- Two independent SIF inputs
- Parallel operation of the AM demodulator and QPS mixer (for NICAM-L stereo sound).

4.5.3 PINNING

Pin	Symbol	Function
1, 2	Vi, SIF1	SIF1 input (symmetrical)
3	VSW	Input selector switch
4, 9, 16	GND	Ground
5	VAGC	SIF - AGC (time constant)
6, 7	Vi, VIF	VIF input (symmetrical)
8	CAGC	VIF - AGC (time constant)
10	RTOP	Take Over Point, tuner AGC
11	Itun	Tuner AGC output current
12	VO, VID	Video output
13	VSW	Standard switch
14	VSW	L' switch
15	Cbl	Black level capacitor
17	Cref	Internal reference voltage
18	LF	Loop Filter
19	VSW	AFC switch
20, 21	VVCO	VCO circuit
22	VAFC	AFC output
23	VS	Supply voltage
24	VO, FM	Intercarrier output
25	VO, AM	AF output - AM sound
26	Rcomp	Offset compensation
27, 28	Vi, SIF2	SIF2 input (symmetrical)

4.5.4 BLOCK DIAGRAM



4.6 TDA894XJ STEREO AUDIO AMPLIFIER

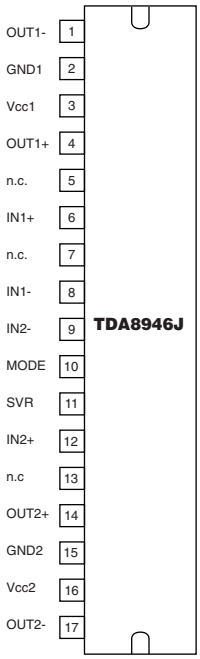
The TDA 8944J (TDA 8946J) is a dual-channel audio power amplifier with an output power of 2 x 7 W (2 x 15 W) at an 8Ω load and a 12 V supply. The circuit contains two Bridges Tied Load (BTL) amplifiers with an all-NPN output stage and standby/mute logic. The TDA8944J comes in a 17-pin DIL power package.

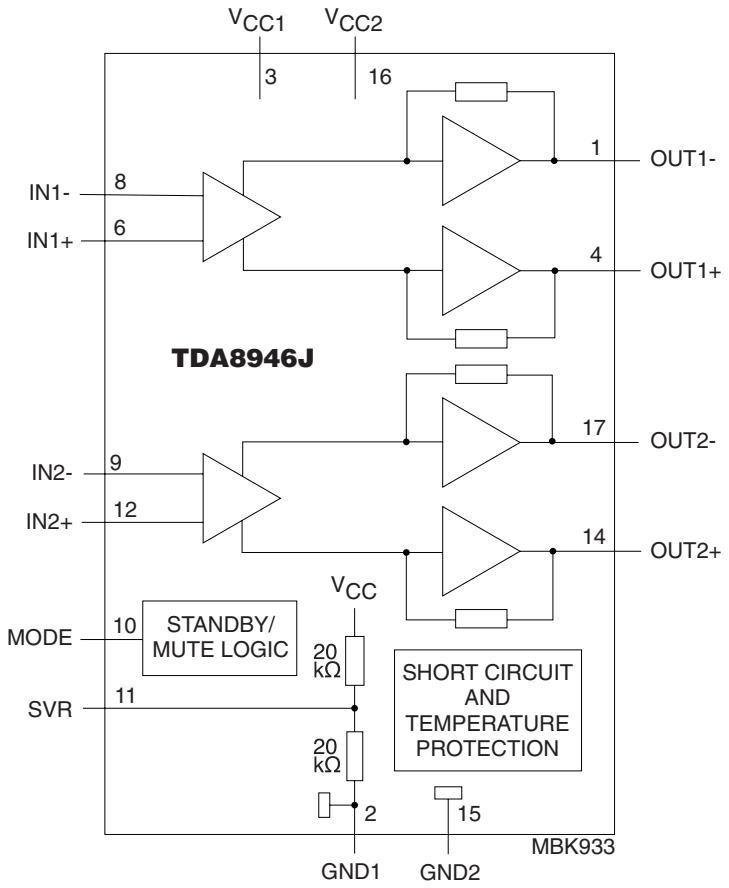
4.6.1 FEATURES

- Few external components
- Fixed gain
- Standby and mute mode
- No on/off switching plops
- low standby current
- High supply voltage ripple rejection
- Outputs short-circuit protected to ground, supply and across the load
- Thermally protected

Pin description

Pin	Symbol	Description
1	OUT1-	negative loudspeaker terminal 1
2	GND1	ground channel 1
3	Vcc1	supply voltage channel 1
4	OUT1+	positive loudspeaker terminal 1
5	n.c.	not connected
6	IN1+	positive input1
7	n.c.	not connected
8	IN1-	negative input1
9	IN2-	negative input2
10	MODE	mode selection input
11	SVR	half supply voltage decoupling (ripple rejection)
12	IN2+	positive input2





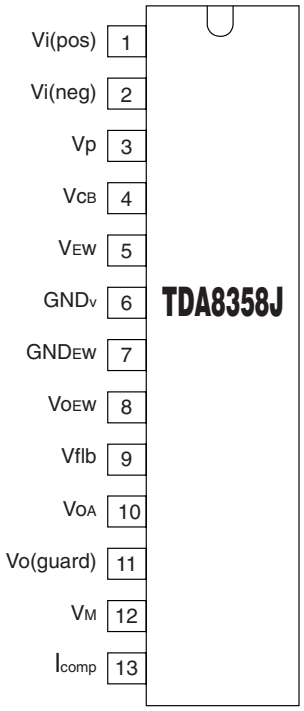
Block Diagram TDA8946J

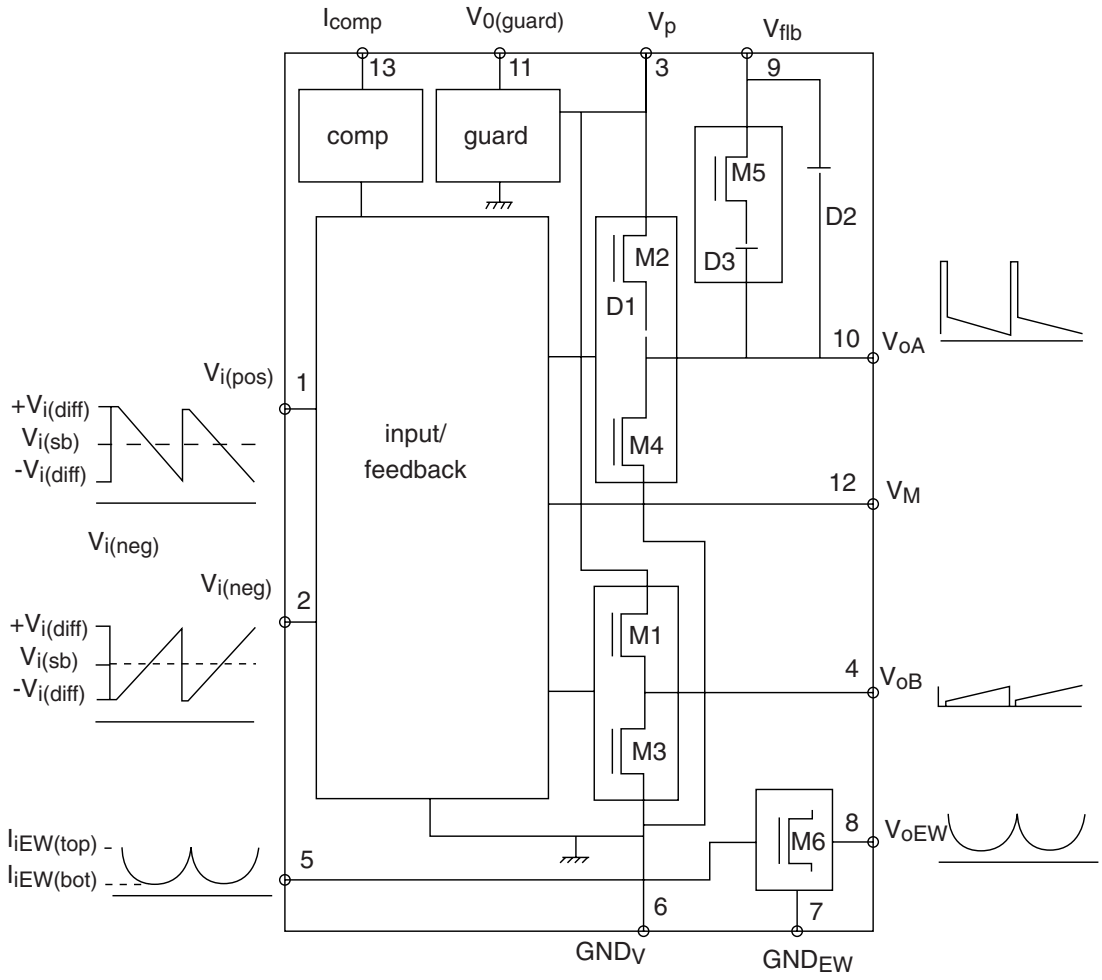
4.7 TDA835XJ VERTICAL AMPLIFIER

The TDA835xJ are power circuit for use in 90° and 110° colour deflection systems for field frequencies of 25 to 200Hz and 16/9 picture tubes. The circuit provides a DC driven vertical deflection output circuit, operating as a highly efficient class G system. Due to the full bridge output circuit the deflection coils can be DC coupled.
The IC is constructed in a Low Voltage DMOS process that combines Bipolar, CMOS and DMOS devices. MOS transistors are used in the output stage because of the absence of second breakdown.

4.7.1 TDA8358J
An East-West output stage is provided that is able to sink current from the diode modulator circuit.

Features :
- Few external components
- Highly efficient fully DC-coupled vertical output bridge circuit
- Short rise and fall time of the vertical flyback switch
- Guard circuit
- Temperature (thermal) protection
- High EMC because of common mode inputs
- East-West output stage


Vi(pos) 1
Vi(neg) 2
Vp 3
VCB 4
VEW 5
GNDV 6
GNDEW 7
VOEW 8
Vflb 9
VOA 10
Vo(guard) 11
VM 12
Icomp 13
TDA8358J


Icomp
V0(guard)
Vp
Vflb
13
11
3
9
comp
guard
M5
D2
M2
D3
D1
10
VOA
Vi(pos)
1
+Vi(diff)
Vi(sb)
-Vi(diff)
input/
feedback
M4
12
VM
Vi(neg)
Vi(neg)
2
+Vi(diff)
Vi(sb)
-Vi(diff)
M1
4
VOB
M3
IiEW(top)
IiEW(bot)
M6
8
VOEW
5
6
7
GNDV
GNDEW

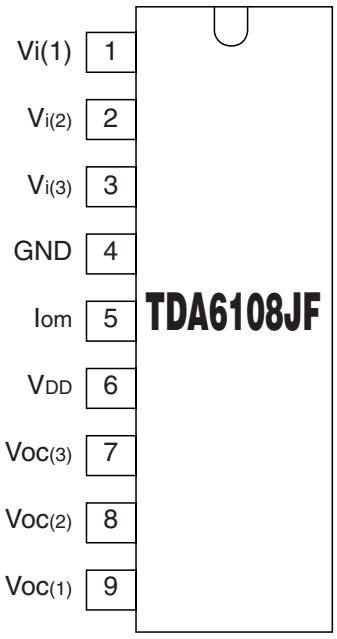
4.8 The TDA6108JF includes three video output amplifiers in one plastic DIL-bent-SIL 9-pin medium power(DBS9MPF) package(SOT111-1), using high-voltage DMOS technology, and is intended to drive the three cathodes of a colours CRT directly. To obtain maximum performance, the amplifier should be used with black-current control.

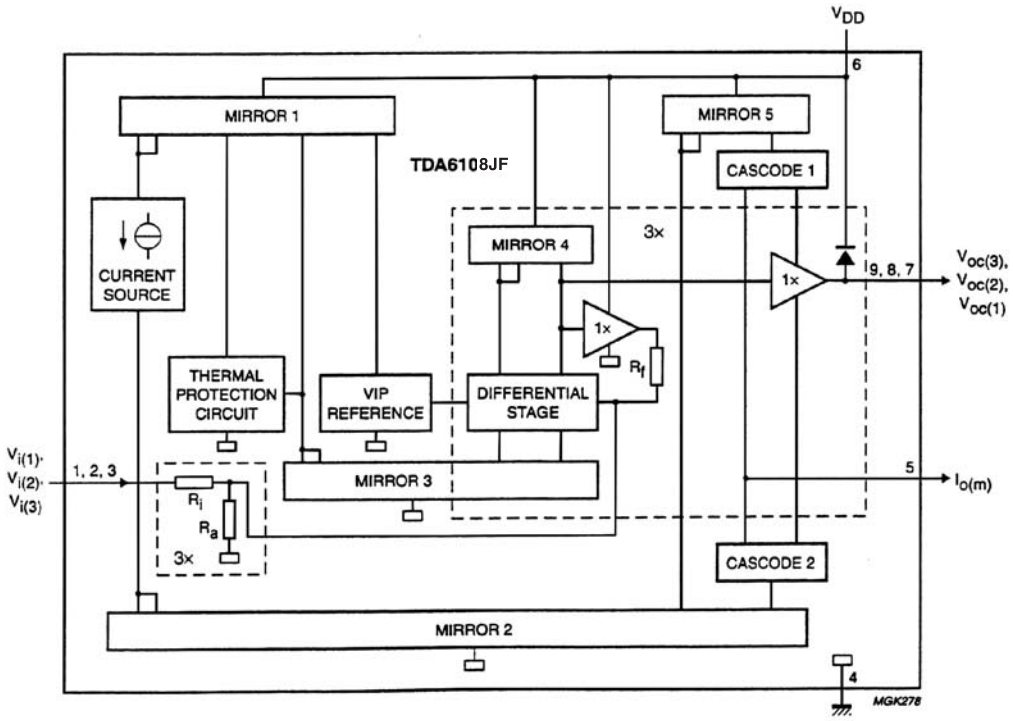
Features

- Typical bandwidth of 9.0 MHz for an output signal of 60 V(p-p)
- High slew rate of 1850V/μs
- No external components required
- Very simple application
- Single supply voltage of 200V
- Internal reference voltage of 2.5 V
- Fixed gain of 51

Pin description

Pin	Symbol	Description
1	Vi(1)	inverting input1
2	Vi(2)	inverting input2
3	Vi(3)	inverting input3
4	GND	ground(fin)
5	Iom	black current measurement output
6	VDD	supply voltage
7	Voc(3)	Cathode output3
8	Voc(2)	cathode output2
9	Voc(1)	cathode output1





Block diagram TDA6108JF

4.9 24C16 - 16 KB EEPROM

Features :

- 16 Kbit serial I2C bus EEPROM
- Single supply voltage : 4.5 V to 5.5 V
- 1 Million Erase/Write cycles (minimum)
- 40 year data retention (minimum)

Pin description

Pin No.	Name	Description
1, 2, 3	E0, E1, E2	Device address ? not used
5	SDA	Serial Data/Address Input/Output
6	SCL	Serial clock
7	WC	Write control
8	Vcc	Supply voltage
4	Vss	Ground

The memory device is compatible with the I2C memory standard. This is a two wire serial interface that uses a bi-directional data bus and serial clock. The memory carries a built-in 4-bit unique device type identifier code (1010) in accordance with the I2C bus definition.

Serial Clock (SCL)

The SCL input is used to strobe all data in and out of the memory.

Serial Data (SDA)

The SDA pin is bi-directional, and is used to transfer data in or out of the memory

4.10 STR - W6754

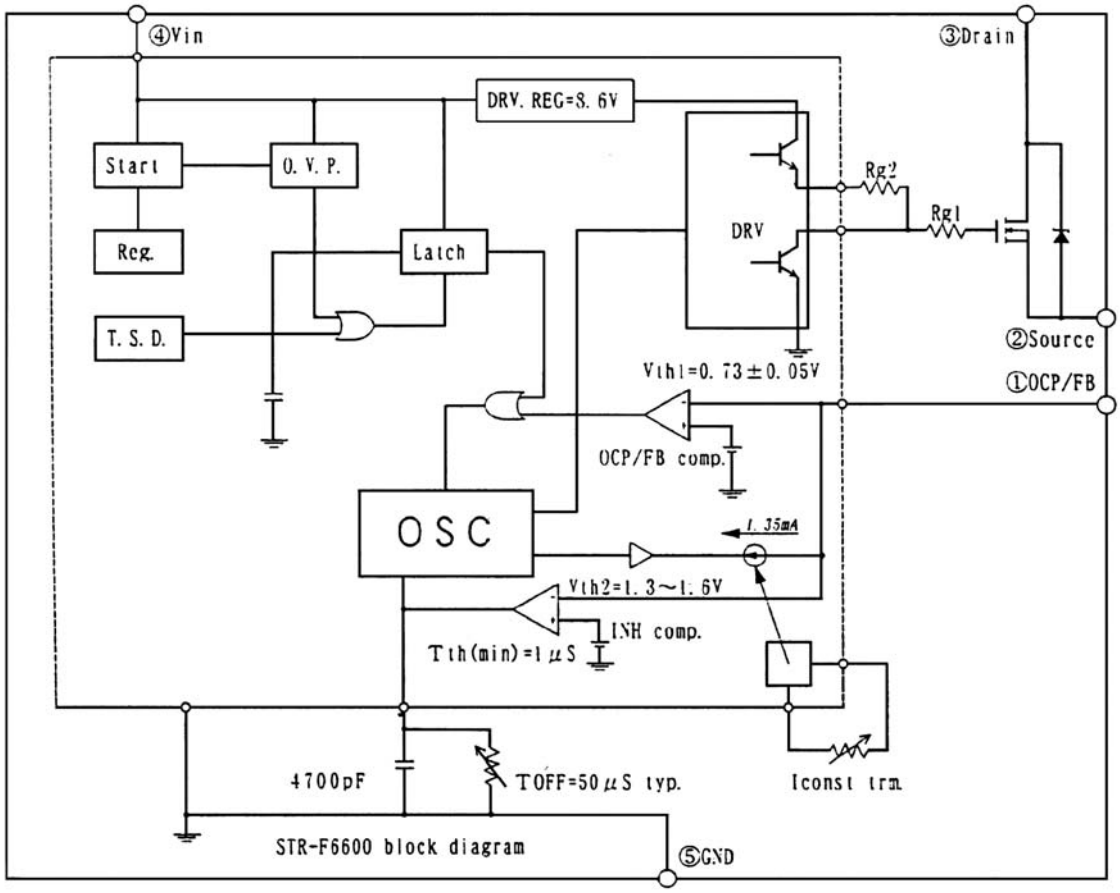
4.10.1 GENERAL DESCRIPTION

The STR-W6754 is an hybrid IC with a build-in MOSFET and control IC, designed for flyback converter type switch mode power supply applications.

4.10.2 FEATURES

- Rugged 650 V Avalanche-Rated MOSFET, Simplified Surge Absorption, No VDSS Derating Required
- 0.96 Ω Maximum rDS(on)
- Two Operational Modes by Automatic Switching: Quasi-Resonant Mode for Normal Operation, Burst Mode for Standby Operation or Light Loads
- Automatic or Manually Triggered Burst Standby Input Power <0.1 W at No Load
- Low Operating Current (6 mA typ)
- Auto-Bias Function Stable Burst Operation Without Generating Interference
- Internal Off-Timer Circuit
- Built-In Constant-Voltage Drive
- Multiple Protections: Pulse-by-Pulse Overcurrent Protection, Overload Protection with Auto Recovery, Latching Overvoltage Protection, Undervoltage Lockout with Hysteresis
- RoHS Compliant

4.10.3 BLOCK DIAGRAM



4.10.4 ELECTRICAL CHARACTERISTICS at TA = +25°C, VCC = 20 V, voltage measurements are referenced to S/GND terminal(unless otherwise specified).

Characteristic	Symbol	Test Conditions	Limits			
			Min.	Typ.	Max.	Units
Start-Up Operation						
Operation Start Voltage	$V_{CC(ON)}$	Turn-on, V_{CC} = 0 → 19.9 V	16.3	18.2	19.9	V
Soft-Start Operation Stop Voltage	$V_{SS/OLP}$		1.1	1.2	1.4	V
Soft-Start Oper. Charging Current	$I_{SS/OLP}$		-390	-550	-710	μA
Operation Stop Voltage	$V_{CC(OFF)}$	Turn-off, V_{CC} = 19.9 → 8.8 V	8.8	9.7	10.6	V
Circuit Current in Non-Operation	$I_{CC(OFF)}$	V_{CC} = 15 V	–	–	100	μA
Normal Operation						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = 300 μA	650	–	–	V
Drain Leakage Current	I_{DSS}	V_{DS} = 650 V	–	–	300	μA
On-State Resistance	$r_{DS(on)}$	I_D = 1.9 A, T_J = +25°C	–	–	0.96	Ω
Switching Time	t_f		–	–	400	ns
Circuit Current	$I_{CC(ON)}$		–	–	6.0	mA
Oscillation Frequency	f_{osc}		19	22	25	kHz
Bottom-Skip Oper. Threshold Volt.	$V_{OCPBD(BS1)}$		-605	-665	-720	mV
	$V_{OCPBD(BS2)}$		-385	-435	-485	mV
Quasi-Resonant Oper. Threshold	$V_{OCPBD(TH1)}$		280	400	520	mV
	$V_{OCPBD(TH2)}$		670	800	930	mV
Feedback-Pin Threshold Voltage	$V_{FB(OFF)}$		1.32	1.45	1.58	V
Feedback-Pin Current	$I_{FB(ON)}$		600	1000	1400	μA
Standby Operation						
Standby Operation Start Voltage	$V_{CC(S)}$	V_{CC} = 0 → 12.2 V	10.3	11.1	12.1	V
Standby Oper. Start Volt. Interval	V_{CC}		1.10	1.35	1.65	V
Standby Non-Operation Current	$I_{CC(S)}$	V_{CC} = 10.2 V	–	20	56	μA
Feedback-Pin Current	$I_{FB(ON)}$	V_{CC} = 10.2 V	–	4.0	14	μA
Feedback-Pin Threshold Voltage	$V_{FB(S)}$	V_{CC} = 12.2 V	0.55	1.10	1.50	V
Minimum ON Time	$t_{on(min)}$		0.5	0.8	1.2	μs

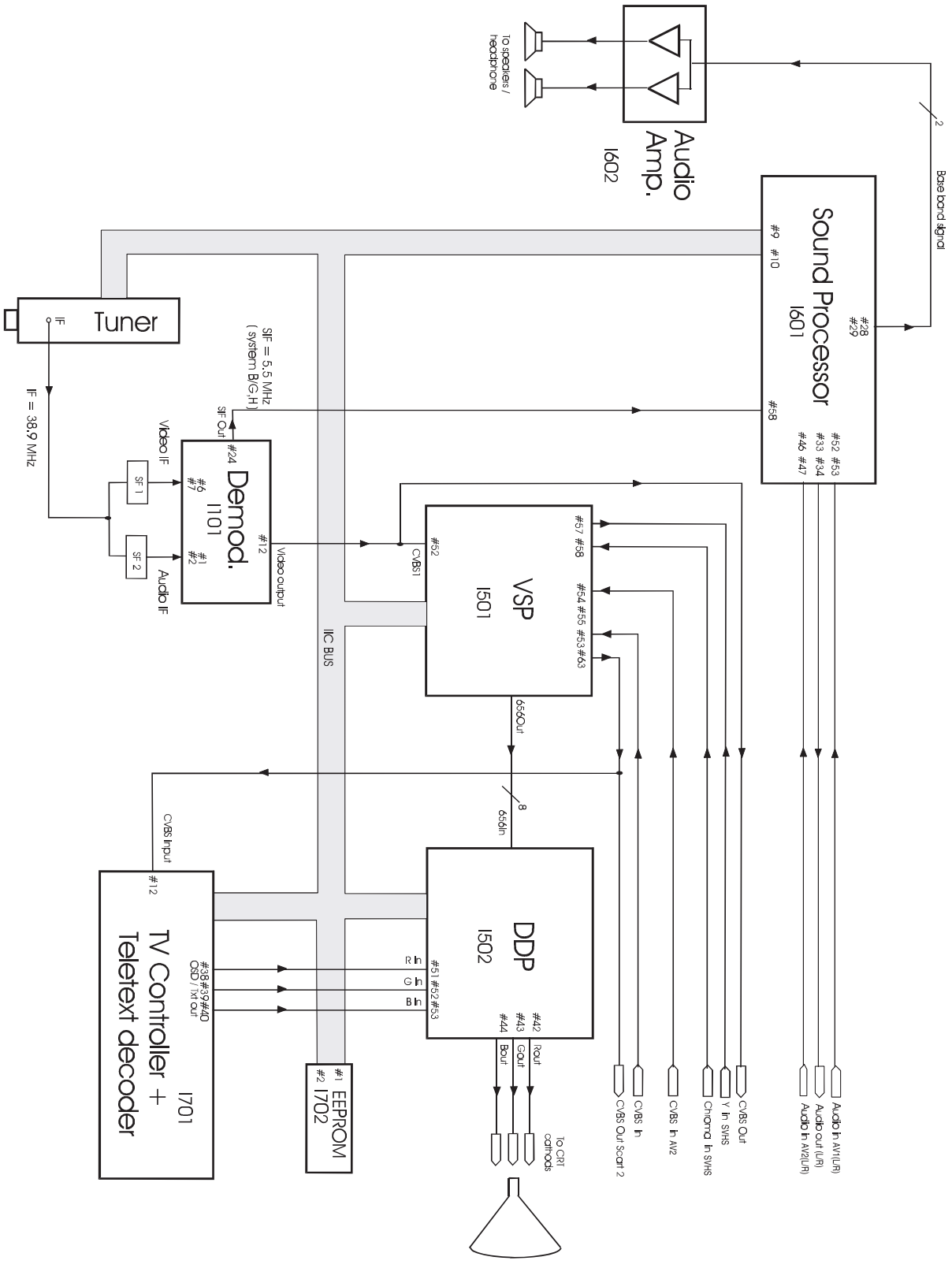
ELECTRICAL CHARACTERISTICS at T_A = +25°C, V_{CC} = 20 V, voltage measurements are referenced to S/GND terminal (unless otherwise specified).

Characteristic	Symbol	Test Conditions	Limits			
			Min.	Typ.	Max.	Units
Protection Operation						
OVP Operation Voltage	$V_{CC(OVP)}$	Turn-off, V_{CC} = 0 → 29.9 V	25.5	27.7	29.9	V
Maximum ON Time	$t_{on(max)}$		27.5	32.5	39.0	μs
OLP Operation Voltage	V_{SSOLP}		4.0	4.9	5.8	V
OLP Operation Current	I_{SSOLP}		-6.0	-11	-16	μA
Overcurrent Detect. Threshold Volt.	$V_{OCPBD(LIM)}$		-0.895	-0.940	-0.995	V
OCP/BD-Pin Current	I_{OCPBD}		-40	-100	-250	μA
Latch Holding Current	$I_{CC(H)}$	V_{CC} = 29.9 → $V_{CC(OFF)}$ – 0.3 V	–	45	140	mA
Latch Release Voltage	$V_{CC(L)}$	V_{CC} = 29.9 → 6 V	6.0	7.2	8.5	V
Other						
Thermal Resistance	$R_{\theta JF}$	Output junction-to-frame	–	–	1.6	°C/W

NOTES: 1. Typical Data is for design information only.
2. Negative current is defined as coming out of (sourcing) the specified device termninal.

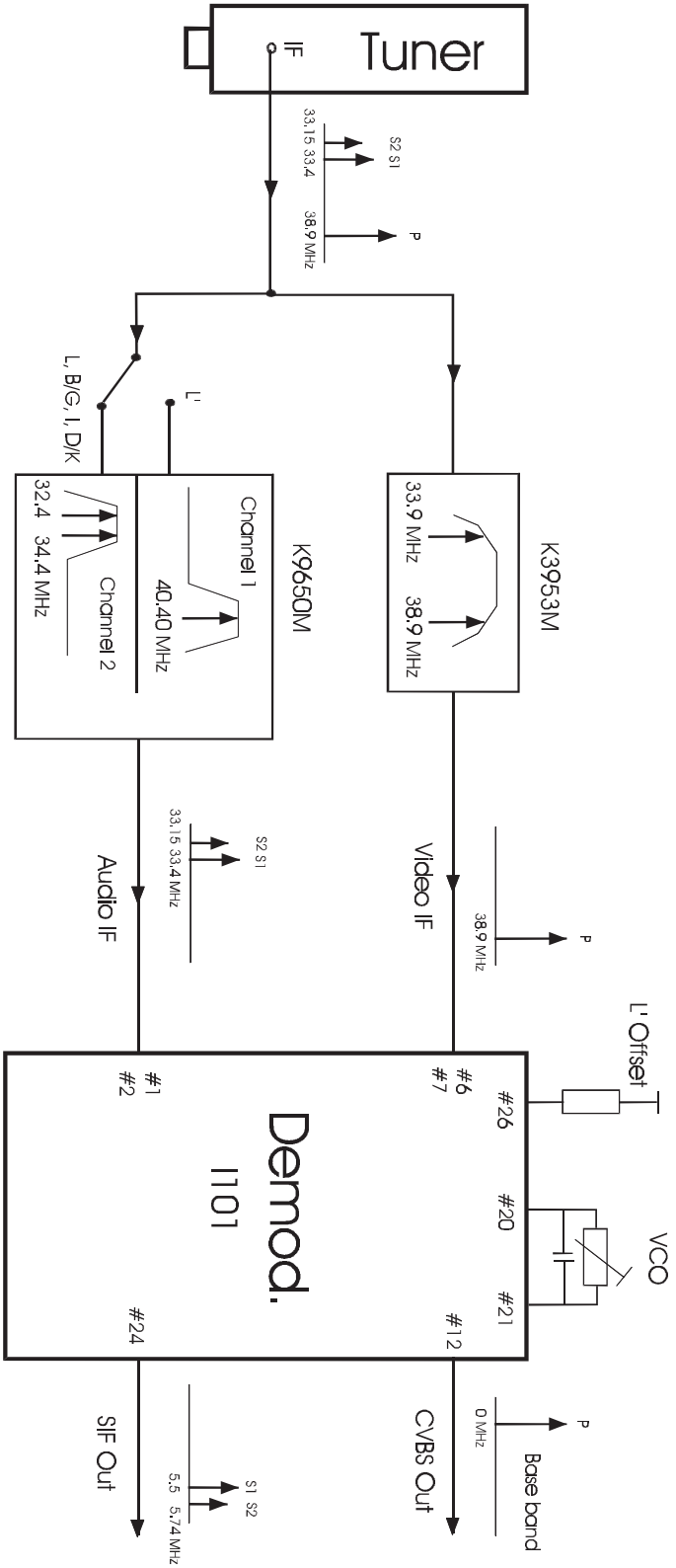
5 CP-850/F CHASSIS DESCRIPTION

5.1 BLOCK DIAGRAM



5.2 IF SECTION

5.2.1 BLOCK DIAGRAM



5.2.2 VISION IF AMPLIFIER

The video IF signal (VIF) is fed through a SAW filter to the differential input (Pin 6-7) of the VIF amplifier. This amplifier consists of three AC-coupled amplifier stages. Each differential amplifier is gain controlled by the automatic gain control (VIF-AGC). The output signal of the VIF amplifier is applied to the FPLL carrier generation and the video demodulator.

SAW filters

Ref.	Standard	Features
K3953M	B/G - D/K - I - L/L'	■ IF filter for video application ■ TV IF filter with Nyquist slopes at 33.9 MHz and 38.9 MHz ■ Constant group delay
K9650M	B/G - D/K - I - L/L'	■ IF filter for audio application ■ TV IF audio filter with two channels ■ Channel 1 (L') with one pass band for sound carrier at 40.40 MHz ■ Channel 2 (L, D/K, I, B/G) with one pass band for sound carriers between 32.40 MHz and 33.40 MHz

5.2.3 TUNER-AND VIF-AGC

At Pin 8, the VIF-AGC charges/discharges the AGC capacitor to generate a control voltage for setting the gain of the VIF amplifier and tuner in order to keep the video output signal at a constant level. Therefore, in the case of all negative modulated signals (e.g., B/G standard) the sync. level of the demodulated video signal is the criterion for a fast charge/discharge of the AGC capacitor. For positive modulation (e.g., L standard) the peak white level of video signal controls the charge current. In order to reduce reaction time for positive modulation, where a large time constant is needed, an additional black level detector controls the discharge current in the event of decreasing VIF input signal. The control voltage (AGC voltage at Pin 8) is transferred to an internal control signal, and is fed to the tuner AGC to generate the tuner AGC current at Pin 11 (open collector output). The take over point of the tuner AGC is adjusted at Pin 10 by an external dc voltage from microprocessor. A PWM output from microcontroller is low pass filtered for this AGC control. See also “AGC” adjustment for details on how to align TOP in SERVICE mode.

5.2.4 FPLL, VCO AND AFC

The FPLL circuit (frequency phase locked loop) consists of a frequency and phase detector to generate the control voltage for the VCO tuning. In the locked mode, the VCO is controlled by the phase detector and in unlocked mode, the frequency detector is superimposed. The VCO operates with an external resonance circuit (L and C parallel) and is controlled by internal varicaps. The VCO control voltage is also converted to a current and represents the AFC output signal at Pin 22. At the AFC switch (Pin 19) three operating conditions of the AFC are possible: AFC curve “rising” or “falling” and AFC “off”. A practicable VCO alignment of the external coil is the adjustment to zero AFC output current at Pin 22. At center frequency the AFC output current is equal to zero. Furthermore, at Pin 14, the VCO center frequency can be switched for setting to the required L' value (L' standard). The optional potentiometer at Pin 26 allows an offset compensation of the VCO phase for improved sound quality (fine adjustment). Without a potentiometer (open circuit at Pin 26), this offset compensation is not active. The oscillator signal passes a phase shifter and supplies the in-phase signal~(°) and the quadrature signal(9~°)of the generated picture carrier.

5.2.5 VIDEO DEMODULATION AND AMPLIFIER

The video IF signal, which is applied from the gain controlled IF amplifier, is multiplied with the inphase component of the VCO signal. The video demodulator is designed for low distortion and large bandwidth. The demodulator output signal passes an integrated low pass filter for attenuation of the residual vision carrier and is fed to the video amplifier. The video amplifier is realised by an operational amplifier with internal feedback and 8 MHz bandwidth. A standard dependent dc level shift in this stage delivers the same sync. level for positive and negative modulation. An additional noise clipping is provided. The video signal is fed to VIF-AGC and to the video output buffer. This amplifier with a 6 dB gain offers easy adaptation of the sound trap. For nominal video IF modulation the video output signal at Pin 12 is 2 Vpp.

5.2.6 SOUND IF AMPLIFIER AND SIF-AGC

The SIF amplifier is nearly identical with the 3-stage VIF amplifier. Only the first amplifier stage exists twice and is switchable by a control voltage at Pin 3. Therefore with a minimal external expense it is possible to switch between two different SAW filters. Both SIF inputs features excellent cross-talk attenuation and an input impedance which is independent from the switching condition. The SIF-AGC is related to the average level of AM- or FM-carrier and controls the SIF amplifier to provide a constant SIF signal to the AM demodulator and QPS mixer.

5.2.7 QUASI-PARALLEL-SOUND (QPS) MIXER

The QPS mixer is realised by a multiplier. The SIF signal (FM or NICAM carrier) is converted to the intercarrier frequency by the regenerated picture carrier (quadrature signal) which is provided from the VCO. The intercarrier signal is fed via an output amplifier to Pin 24.

5.2.8 STANDARD SWITCH

To have equal polarity of the video output signal the polarity can be switched in the demodulation stage in accordance with the TV standard. Additional a standard dependent dc level shift in the video amplifier delivers the same sync. level. In parallel to this, the correct VIF-AGC is selected for positive or negative modulated VIF signals. In the case of negative modulation (e.g., B/G standard) the AM output signal is switched off. For positive modulation (L standard) the AM demodulator and QPS mixer is active. This condition allows a parallel operation of the AM sound signal and the NICAM-L stereo sound.

5.2.10 INTERNAL VOLTAGE STABILISER

The internal bandgap reference ensures constant performance independent of supply voltage
and temperature.

5.3 VIDEO / RGB

5.3.1 FRONT END

5.3.1.1 CVBS Front-End

The CVBS front-end consists of the colour-decoding circuit itself, a sync processing circuit for generation of H/V signals out of the CVBS signal, and the luminance processing. The main task of the luminance processing is to remove the colour carrier by means of a notch filter. For PAL and SECAM operation a baseband delay line is used for U and V signals. This can be used as comb filter in NTSC operation (only for chrominance).

5.3.1.2 Input Selector
The analog CVBS or SVHS luma signal are fed to the inputs CVBS1...7 of VSP94x2A (amplitude 0.5...1.5 V pp). One signal is selected and fed to the first ADC. A second signal (SVHS Chroma) can be selected and fed to the other ADC. After clamping to the back porch both signals are AD-converted with an amplitude resolution of 9 bit. The AD conversion is done using a 20.25 MHz free-running stable crystal clock. Before the A to D conversion the signals are lowpass filtered to avoid antialias effects. One input is looped back to output CVBSO1(#63). A signal addition is performed to output a CVBS signal even when separate Y/C signals are used at input.

5.3.1.3 Signal Levels And Gain Control To adjust to different CVBS input voltages a digitally working automatic gain control is implemented. Input voltages in the range between 0.6 to 1.8 V pp can be applied to the CVBS inputs.

5.3.1.4 Synchronization
After elimination of the high frequent components of the CVBS signal by a low pass filter, horizontal and vertical sync pulses are separated. Horizontal sync pulses are generated by a digital phase locked loop. The time constant is adjusted between fast and slow behaviour to accommodate different input sources (e.g. VCR).

5.3.1.5 Chroma Decoder
The digital multistandard chroma decoder is able to decode NTSC and PAL signals with a subcarrier frequency of 3.58 MHz and 4.43 MHz as well as SECAM signals with automatic standard detection. The TV controller software has configured the colour decoder to operate in automatic detection mode. When the signal source comes from the tuner, only SECAM and PAL (50Hz) standard are enabled. In AV mode or when program number 0 is selected the following standards are also enabled : NTSC M, NTSC 4.43 and PAL 60. The demodulation is done with a regenerated colour-carrier.

5.3.1.6 Luminance Processing
A luminance notch filter is implemented to separate the chroma information from the luminance. Depending on the colour standard, one out of three different notch characteristics is chosen (‘PAL’, ‘NTSC’, ‘SECAM’) automatically.

5.3.1.7 RGB Front-End
An analogue RGB input port for an external RGB source is available. The incoming signal is clamped to the back porch by a clamping pulse. This input as an overlay input (soft mix). The RGB signal must then be synchronised to the main CVBS/YC signal.

5.3.1.8 Signal Processing
5.3.1.8.1 Horizontal Prescaler
The main application of the horizontal prescaler is the conversion of the number of pixels coming form the 40.5/20.25 MHz pixel clock domain down to the number of pixels stored in the memory (factor 2/3). Generally the number of incoming pixels can be decimated by a factor between 1 and 64 in a granularity of 2 output pixels. The horizontal scaler reduces the number of incoming pixels by subsampling. To prevent the introduction of alias distortion low pass filters are used for luminance and chrominance processing. The horizontal prescaler consists of two main subsampling stages. The first stage is a scaler for rational decimation factors in a range of 1 to 2. The second stage decimates in integer steps (1,2,3,4...32).

5.3.1.8.2 Noise Reduction

The structure of the temporal motion adaptive noise reduction is the same for VSP 94x5C as for chrominance signal. The output of the motion detector is weighted. The look-up table input value range is separated into 8 segments. It is possible to freely program different behaviour of the noise reduction by using predefined curve characteristic for each segment.

5.3.1.8.3 Noise Measurement

The noise measurement algorithm is used to sort program during ATSS. This is done by the TV- microcontroller which reads the noise level in VSP. The value is determined by averaging over several fields.

5.3.1.8.4 Operation Modes

The interlaced input signal (e.g. 50 Hz PAL or 60 Hz NTSC) is composed of a field A (odd lines) and a field B (even lines). The 100Hz operation mode used is simply AABB, where each stored field in the memory is displayed double times on the TV screen. A still field can be displayed using FREEZE command, the operation mode becomes ABAB.

5.3.1.8.5 Digital 656 Output

The output data format corresponds to CCIR 656 with double-scan format (8-bit bus at a data rate of 54 MHz). There all frequencies and data-rates are doubled compared to standard CCIR656 specification. Timing reference codes (SAV, EAV) are inserted according to the specification. The output is set to 720 pixels per line and the display clock is set to 54 MHz.

5.3.2 BACK END

5.3.2.1 Digital Input Interface

The digital input interface is set to receive 8 bit 4:2:2 Y Cr Cb multiplexed with separate H/V-syncs and clock (ITU-R-656 format). The data inputs Y0...Y7 and C0...C7 are clocked with the external clock LLC2. The clock frequency is 54 MHz for 8 bit data input. The horizontal sync pulse at the HS pin should be an active video signal, which is not vertically blanked. A clock generator converts the different external line locked clock rates to a common internal sample rate of approximately 40.5 MHz, in order to provide a fix bandwidth for all digital filters. Therefore the input data is sample rate converted to the common processing frequency by the horizontal scaler.

5.3.2.2 Horizontal Scaler

The horizontal scaler supports linear or nonlinear horizontal scaling of the digital input video signal in the range of 0.25 to 4. Nonlinear scaling, also called “panorama vision”, provides a geometrical distortion of the input picture. It is used to fit a picture with 4:3 format on a 16:9 screen by stretching the picture geometry at the borders. Also, the inverse effect can be produced by the scaler. See also microcontroller section to find details on format switching logic.

5.3.2.3 Luma Contrast and Brightness

The luminance signal is multiplied by a factor of 0...2 (contrast adjustment). The signal can be shifted by ±100% of its maximal amplitude with the digital brightness value

5.3.2.4 Black Level Expander/Compressor (BLEC)

The black level expander/compressor modifies the luminance signal with an adjustable non-linear function to enhance the contrast of the picture.Dark areas are stretched to black, while bright areas remain unchanged. Advantageously, this black level processing is performed dynamically and only if it will be most noticeable to the viewer.

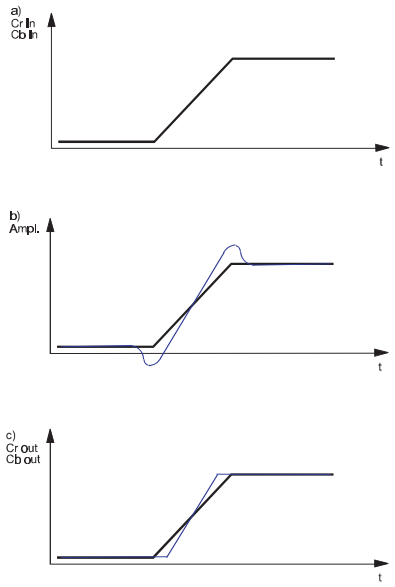
5.3.2.5 Luma Sharpness Enhancer (LSE)
Sharpness is one of the most critical features for optimum picture quality. This important processing is performed in the LSE circuitry of DDP 3315C. It consists of the dynamic peaking, the luma transient improvement (LTI) and an adaptive mixer. The luma input signal is processed in the peaking and LTI block in parallel. Both output signals are combined in the mixer depending on the selected LSE characteristic.

5.3.2.6 Dynamic Peaking
The dynamic peaking improves the details of a picture by contour emphasis. It adapts to the amplitude and the frequency of the input signal. Small detail amplitudes are sharpened, while large detail amplitudes stay nearly unmodified.

5.3.2.7 Luma Transient Improvement (LTI)
For small detail amplitudes the dynamic peaking is the most appropriate processing to improve the sharpness. However, for large amplitudes even small over-and/ or undershoots of the peaking are too annoying. The luma transient improvement enhances the slope of picture detail without these effects by a non-linear processing. The contour correction signal calculated in this block, is limited to the adjacent extreme values to prevent over- and undershoots. The LTI features an adjustable gain control and an adjustable coring threshold to prevent the enhancement of small noise amplitudes.

5.3.2.8 Mixing of Dynamic Peaking and LTI
The contour correction signals of the dynamic peaking and the LTI block are combined by the mixer. Controlled by the amplitude of a picture edge, this circuitry fades between these two signals. Thus, small and medium picture detail is enhanced by contour emphasis (peaking) and large picture detail is enhanced by step-improvement (LTI).

5.3.2.9 Chroma Transient Improvement
The intention of this block is to enhance the chroma resolution. A correction signal is calculated by differentiation of the colour difference signals. The differentiation can be selected according to the signal bandwidth, e.g. for PAL/NTSC/SECAM or digital component signals, respectively. The amplitude of the correction signal is adjustable. Small noise amplitudes in the correction signal are suppressed by an adjustable coring circuit. To eliminate “wrong colours”, which are caused by over and undershoots at the chroma transition, the sharpened chroma signals are limited to a proper value automatically.



a) Cr Cb input of CTI
b) Cr Cb input + correction signal
c) sharpened and limited Cr Cb

5.3.2.10 Analog Back End

The digital RGB signals are converted to analogue RGB by three 10-bit digital to analogue converters (DAC). Each RGB signal has two additional DACs with 9-bit resolution to adjust analogue brightness (40% of the full RGB range) and cutoff / black level (60% of the full RGB range). An additional fixed current is applied for the blanking level.
The back-end supports the insertion of two external analogue component signals, only one is used for OSD/Text from the microcontroller. These signals are clamped, processed in an analogue matrix (RGB2), converted by a voltage/current converter (VCC), and inserted into the main RGB by the fast blank switch. The analogue RGB outputs are current outputs with current- sink characteristics.

5.3.2.11 Analog RGB Insertion

Each component signal is clamped, converted to RGB if required, and inserted into the main RGB by the fast blank switch. The external component signals are adjustable independently as regards DC level (brightness) and magnitude (contrast). Fast Blank selection logic Over-/underlay of the external component signal and the main RGB signal depends on the fast blank input signal.

5.3.2.12 CRT Measurement and Control

In order to define accurate colour on different CRT displays, the cut-off and white drive settings are adjusted in factory depending on the characteristic of CRT phosphor.To guarantee correct colours during the lifetime of the display, a build in automatic tube control loop measures and adjusts the black level on every field and white point every third field. The display processor is equipped with an 9/12-bit PDM-ADC for all picture tube measuring purposes. This MADC is connected to the SENSE input pin, the input range is 0 to 2.6 V. Cutoff and white drive current measurement are carried out with 8-bit resolution during the vertical blanking interval. The current range for cutoff measurement is set by connecting the sense resistor RC591 to the SENSE input. Due to the fact of a 1:10 relation between cutoff and white drive current the range select 2 output (RSW2) becomes active for the white drive measurement and connects R533 in parallel to RC591, thus determining the correct current range. During the active picture, the MADC is used for the average beam current limiter with a 12-bit resolution. Again a different measurement range is selected with active range select 1&2 outputs (RSW1&RSW2) connecting R534 in parallel to R533 and RC591. These measurements are typically done at the summation point of the picture tube cathode currents.

The picture tube measurement returns results on
every field for:
- cutoff R
- cutoff G
- cutoff B
- white drive R or G or B (sequentially)

The average beam current limiter (BCL) works on both the digital YC r C b input from VSP and the inserted analog RGB signals (OSD and Teletext) by using the sense input for the beam current measurement. The BCL uses a different filter to average the beam current during the active picture resulting in a 12-bit resolution. The filter bandwidth is approximately 4 kHz. The beam current limiter allows the setting of a threshold current, a gain and an additional time constant. To accommodate several CRT's, beam current threshold and gain can be modified by microcontroller option2. If the beam current is above the threshold, the excess current is low-pass filtered with the according gain and time constant. The result is used to attenuate the RGB outputs by adjusting the white drive multipliers for the internal (digital) RGB signals, and the analog contrast multipliers for the analog RGB inputs, respectively. The lower limit of the attenuator is programmable, thus a minimum contrast can always be set. If the minimum contrast is reached, the brightness will be decreased to a programmable minimum as well.

5.3.2.13 Synchronization and Deflection

The deflection processing generates the signals for the horizontal and vertical drive. This block contains two numeric phase-locked loops and a security unit:
- PLL2 generates the horizontal and vertical timing, e.g. blanking, clamping and sync signals.
  Phase and frequency are synchronised by the incoming sync signals.
- PLL3 adjusts the phase of the horizontal drive pulse and compensates for the delay of the horizontal output stage.
- The security unit observes the H-Drive output signal.
  With an external 5 MHz reference clock this unit controls the H-drive "off time" and period. In case of an incorrect H-drive signal the security unit generates a free running h-drive signal divided down from beam current

5.3.2.14 EHT Compensation

The vertical deflection waveform is scaled according the average beam current. This is used to compensate the effects of electric high tension changes due to beam current variations. EHT compensation for East/West deflection is done with an offset corresponding to the average beam current.

5.4 MICROCONTROLLER

5.4.1 MICROCONTROLLER FEATURES

- 8-bit 8051 instruction set compatible CPU
- 33.33-MHz internal clock (max.)
- 0.360 μs (min.) instruction cycle
- Two 16-bit timers : schedule software tasks , and user clock
- Watchdog timer
- Capture compare timer for infrared remote control decoding
- Pulse width modulation unit (2 channels 14 bit, 6 channels 8 bit) : used to control AGC Take Over Point .
- ADC (4 channels, 8 bit) : AFT, AGC, Local keys, OCP.
- UART

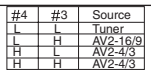
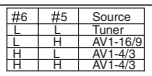
5.4.2 ACQUISITION FEATURES

- Multistandard Digital Data Slicer
- Parallel Multi-norm Slicing (TTX, VPS, WSS)
- Four Different Framing Codes Available
- Data Caption only Limited by available Memory
- Programmable VBI-buffer
- Full Channel Data Slicing Supported
- Fully Digital Signal Processing
- Noise Measurement and Controlled Noise Compensation
- Attenuation Measurement and Compensation
- Group Delay Measurement and Compensation
- Exact Decoding of Echo Disturbed Signals

5.4.3 PORTS

- One 8-bit I/O-port with open drain output and optional I 2 C Bus emulation support (Port 0)
- Two 8-bit multifunction I/O-ports (Port 1, Port 3)
- One 4-bit port working as digital or analogue inputs for the ADC (Port 2)
- One 2-bit I/O-port with secondary functions (P4.2, 4.3, 4.7)

5.4.4 μCONTROLLER I/O PIN CONFIGURATION AND FUNCTION TABLE

PIN	NAME	CONFIGURATION		DESCRIPTION
		STAND BY	TV ON	
3	S/SW2	Open Drain	Open Drain	
4	S/SW2	Open Drain	Open Drain	
5	S/SW1	Open Drain	Open Drain	
6	S/SW1	Open Drain	Open Drain	
8	RESET out	Low	Open Drain	Reset video IC's
15	AFT	High impedance	High impedance	AFT input? ADC input
16	AGC in	High impedance	High impedance	AGC input ? ADC input
17	KEY	High impedance	High impedance	Keyboard input ? ADC input
18	OCP	High impedance	High impedance	Over Current Protection ? Switch
21	Mod SW	High impedance	Push Pull	High = Negative modulation, Low = Positive modulation (L/L').
22	SECAM L'	High impedance	Push Pull	Low = L, High =L'
23	IR	High impedance	High impedance	Infrared Interrupt input
24	SOUND INTInput	input	Sound interrupt input-edge	triggered
48	AGC out	--	PWM out	Control tuner AGC (TOP)
51	LED	Push Pull	Push Pull	Low : LED Red High : LED Green
52	Power	Push Pull - Low	Push Pull - High	SMPS operation mode (Burst/ ON)

5.4.5 OVER CURRENT PROTECTION

In case of overload, the SMPS secondary voltages will drop. The voltage on pin 18 of microcontroller drops below a reference voltage (x.xxV). The controlling software which continuously monitors this voltage will switch the set to stand by mode. To power on the set again the user must switch it off using the main power switch. Appropriate hysteresis guaranty a reliable operation.

5.5 TELETEXT DISPLAY

National character option bits C12, C13, C14 are transmitted in the page header of a given teletext page. The national option bits are intended to change (or exchange) 13 characters within the G0 character set, according to the needs of each national language.

These codes represent, for a given broadcaster, the intended language that the teletext page should be displayed in. As there are only 3 bits, there are only 8 codes available to cover all the possible language combinations. This means that for a received code there are several possibilities meanings, according to the local code of practice.

This is not as bad as it first seems, as we use the user-selected OSD language to identify the intention of the broadcaster. For example, a user wishing to see Russian teletext should select

Russian OSD language, otherwise he would not have correct teletext display on the TV.

The table below allows the reader to understand the relationship between selected OSD language (which is under user control), the teletext language display (selected by national option bits in transmission page header) and the Packet 26 language selection (selected within packet 26 of the transmission page).

An example: For Greek teletext display, (if national option code 1 1 1 is received from the broadcaster), the user should select the Greek OSD language. Even if English, French, German, Italian, Spanish, Dutch, Danish, Finnish, Norwegian

or Swedish OSD languages are selected, the teletext will be correctly displayed.
However, if Polish, Hungarian, Czech, Slovakian, Rumanian or Russian OSD are selected, the consequence will be incorrect teletext display for the national option characters. Romanian national font options will be selected.

OSD Language	C12	C13	C14	PRIMARY LANGUAGE	Secondary Language	X26 Language
English, French,	0	0	0	English	English	West Euro
German, Italian,	0	0	1	German	German	West Euro
Spanish, Dutch,	0	1	0	Scandinavian	Scandinavian	West Euro
Danish, Finnish,	0	1	1	Italian	Italian	West Euro
Norwegian,	1	0	0	French	French	West Euro
Swedish, Greek	1	0	1	Spanish	Spanish	West Euro
	1	1	0	Turkish	Turkish	West Euro
	1	1	1	Greek	English	Greek
Polish,	0	0	0	Polish	Polish	East Euro
Hungarian,	0	0	1	German	German	West Euro
Czech,	0	1	0	Hungarian	Hungarian	East Euro
Slovakian,	0	1	1	Italian	Italian	West Euro
Rumanian	1	0	0	French	French	West Euro
	1	0	1	Serbian	Serbian	East Euro
	1	1	0	Czech	Czech	East Euro
	1	1	1	Rumanian	Rumanian	East Euro
Bulgarian,	0	0	0	English	Russian	Cyrillic
	0	0	1	German	German	West Euro
	0	1	0	Estonian	Estonian	East Euro
	0	1	1	Lettish	Lettish	East Euro
	1	0	0	Russian	English	Cyrillic
	1	0	1	Ukrainian	English	Cyrillic
	1	1	0	Czech	Czech	East Euro
	1	1	1	Rumanian	Rumanian	Cyrillic

5.6 SOUND PROCESSING

5.6.1 ANALOGUE SOUND IF - INPUT SECTION

The input pins ANA_IN1+ and ANA_IN- offer the possibility to connect sound IF sources to the MSP 341xG. The analogue-to-digital conversion of the preselected sound IF signal is done by an A/D converter, whose output is used to control an analogue automatic gain circuit (AGC), providing an optimal level for a wide range of input levels.

5.6.2 QUADRATURE MIXERS

The digital input coming from the integrated A/D converter may contain audio information at a frequency range of theoretically 0 to 9 MHz corresponding to the selected standards. By means of two programmable quadrature mixers, two different audio sources ; for example, NICAM and FM-mono, may be shifted into baseband position.

5.6.3 PHASE AND AM DISCRIMINATION

The filtered sound IF signals are demodulated by means of the phase and amplitude discriminator block. On the output, the phase and amplitude is available for further processing.

AM signals are derived from the amplitude information, whereas the phase information serves for FM and NICAM demodulation.

5.6.4 NICAM DECODER

In case of NICAM - mode, the phase samples are decoded according the DQPSK - coding scheme. The output of this block contains the original NICAM bitstream.

5.6.5 DSP SECTION

All audio baseband functions are performed by digital signal processing (DSP). The DSP section controls the source and output selection, and the signals processing.

5.6.6 SOUND MODE SWITCHING

In case of NICAM transmission, the controlling software read the bit error rate and the operation mode from the NICAM Decoder. When the set is in “Auto detection” mode (default mode after ATSS) the MSP firmware set automatically the sound mode (NICAM mono, NICAM Dual 1 or NICAM Dual 2) depending on the transmitted mode.
In case of 2 Carrier FM transmission, the MSP firmware read the transmission mode and the signal quality level from the Stereo Detection Register. When the set is in “Auto detection” mode the firmware set automatically the sound mode (mono, Stereo, Dual 1, Dual 2) depending on the transmitted mode.
In “Auto detection” mode the firmware evaluate the signal quality and automatically switch to the analogy sound carrier 1, if the transmission quality is too poor. To avoid unwanted automatic switching the threshold levels mono to stereo and stereo to mono is different.When the sound mode change, the MSP firmware informs the microcontroller by rising pin 4. This generates an interrupt to the controller, which then read MSP registers via I2C bus to know the new sound status, and update OSD when needed.In “forced mono” mode (locker icon), the controlling software configure the MSP341xG to demodulate only the analogue (FM or AM) sound carrier 1, no matter the signal quality. The sound mode “forced” or “Autodetect” is stored for each programme.

5.7 SOUND AMPLIFICATION

The TDA8944J (TDA8946J) is a stereo BTL audio amplifier capable of delivering 2 x 7 W (2 x 15 W) output power to an 8 Ω load at THD = 10%, using a 12 V power supply and an external heatsink. The voltage gain is fixed at 32dB.

With the three-level MODE input the device can be switched from ‘standby’ to ‘mute’ and to ‘operating’ mode.
The TDA 8944J outputs are protected by an internal thermal shutdown protection mechanism and short-circuit protection.

5.7.1 POWER AMPLIFIER

The power amplifier is a Bridge Tied Load (BTL) amplifier with an all-NPN output stage, capable of delivering a peak output current of 1.5 A.
The BTL principle offers the following advantages :

- Lower peak value of the supply current.
- The ripple frequency on the supply voltage is twice the signal frequency.
- No DC-blocking capacitor
- Good low frequency performance

5.7.2 MODE SELECTION

The TDA894xJ has several functional modes, which can be selected by applying the proper DC voltage to pin MODE.

Mute : In this mode the amplifier is DC biased but not operational (no audio output). This allows the input coupling capacitors to be charged to avoid pop-noise. The devices is in mute mode when 2.5 V < VMODE < (Vcc-1.5 V).

Operating : In this mode the amplifier is operating normally. The operating mode is activated at VMODE < 0.5 V.

5.8 VERTICAL DEFLECTION

The vertical driver circuit is a bridge configuration. The deflection coil is connected between the output amplifiers, which are driven in phase opposition. The differential input circuit is voltage driven. The input circuit is especially intended for direct connection to driver circuits which deliver symmetrical current signals, but is also suitable for asymmetrical currents. The output current of these devices is converted to voltages at the input pins via resistors R350 and R351. The differential input voltage is compared with the output current through the deflection coils measured as voltage across R302, which provides internal feedback information. The voltage across R302 is proportional to the output current.

5.8.1 FLYBACK VOLTAGE

The flyback voltage is determined by an additional supply voltage Vflb. The principle of operation with two supply voltages (class G) makes it possible to fix the supply voltage Vp optimum for the scan voltage and the second supply voltage Vflb optimum for the flyback voltage. Using this method, very high efficiency is achieved. The supply voltage Vflb is almost totally available as flyback voltage across the coil, this being possible due to the absence of a coupling capacitor.

5.8.2 PROTECTION

The output circuit has protection circuits for :

- Too high die temperature
- overvoltage of output stage A

5.8.3 GUARD CIRCUIT

The guard signal is not used by the video IC to blank the screen in case of fault condition.

5.8.4 DAMPING RESISTOR

For HF loop stability a damping resistor (R331) is connected across the deflection coil.

5.8.5 EAST-WEST AMPLIFIER (TDA8358J ONLY)

The East-West amplifier is current driven. It can only sink currents of the diode modulator circuit.
A feedback resistor R397 is connected between the input and output of this inverting amplifier in order to convert the East-West correction input into an output voltage.

6. SERVICE PARTS LIST

Caution:In this Service Manual, some parts can be changed for imroving, their performance without notice in the parts list. So, If you need the latest parts information, please refer to PPL(Parts Price List)in Service information Center(http://svc.dwe.co.kr)

6.1 DTK-29G2

LOC	PART CODE	PART NAME	DESCRIPTION	REMARK
ZZ110	PTACPWE251	ACCESSORY AS	DTK-29G2FSS-SB	
00010	4850Q00910	BATTERY	AAA R03 SUPERGARD/ROCKET	
00020	4858213801	BAG INSTRUCTION	L. D. P. E. T0. 05X250X400	
ZZ100	48B5849C1001	TRANSMITTER REMOCON	R-49C10	
ZZ120	PTBCSHE251	COVER BACK AS	DTK-29G2FSS-SB	
M211	4852172411G	COVER BACK	29G2 HIPS GY8301A	
M541	4855415800	S/PLATE	150ART P/E FILM (C/TV)	
M542	485580002207	LABEL SERIAL	ART 90	
ZZ130	PTPKCPE251	PACKING AS	DTK-29G2FSS-SB	
M681	2TP06575CL	TAPE OPP	T0.065XW75X500M CLEAR	
M801	DMP5019300	BOX	DTZ-29G2 (NEW)	
M811	485819BP00UP	PAD UP	29G2 EPS	
M811A	485819BP00DN	PAD DOWN	29G2 EPS	
M822	4858215601	BAG P.E.	"PE FOAM T0.5X1600X1270 25""28"""	
ZZ140	PTCACAE251	CABINET AS	DTK-29G2FSS-SB	
M191	4851954700	DOOR AS	29G2 GY340A+SV128BP/PC	
M201D	4856815900	CLAMP WIRE	EGI T0.4+PVC COATING	
M202	4857624300	INSU PLATE	PVC T0.5 BK 21U6	
M211A	7172401652	SCREW TAPPTITE	TT2 TRS 4X16 MFZN BK 3CR	
M211B	7172401252	SCREW TAPPTITE	TT2 TRS 4X12 MFZN BK 3CR	
M211D	4857817610	CLOTH BLACK	"300 MM 20"""	
M231A	7172401252	SCREW TAPPTITE	TT2 TRS 4X12 MFZN BK 3CR	
M352	2TF01612CL	TAPE FILAMENT	12MMX55ME CLEAR	
M481	4854869811	BUTTON POWER	29G2 ABS GY340A+SV128BP	
M481A	4856715600	SPRING	14A5 SWPA	
M501	485506190001	DECO CTRL	29G2 PVC T0.25	
M561	48556293SD02	MARK BRAND	"DAEWOO 25""29""32"" NEW"	
M681	4856812001	TIE CABLE	NYLON66 DA100	
M791	4857923300	DOOR LOCK	LA701 (KIFCO)	
PWC1	4859903110	CORD POWER	W/F 6-LO (LOMAX)	
SP01A	7172401252	SCREW TAPPTITE	TT2 TRS 4X12 MFZN BK 3CR	
SP02A	7172401252	SCREW TAPPTITE	TT2 TRS 4X12 MFZN BK 3CR	
V901	4859651660	"CRT (SAMSUNG 29""")"	A68QFN793X104	
V901A	4856215402	WASHER RUBBER	20"	
V901B	4856017752	SCREW CRT FIX	6X35 L120 YL 3CR	
ZZ131	58G0000182	COIL DEGAUSSING	DC-29SF AL	
ZZ132	48519A7810	CRT GROUND AS	2903S-1015-1P	
ZZ200	PTFMSJE251	MASK FRONT AS	DTK-29G2FSS-SB	
M201	4852090611S	MASK FRONT	29G2 GY340A	
M231	4852330811	PANEL FRONT	29G2 HIPS BK+GY8204BP	
ZZ210	PTSPPWE251	SPEAKER AS	DTK-29G2FSS-SB	
P601A	4850704S30	CONN AS	YH025-04+35098+ULW=700	
SP01	4858317410	SPEAKER	SP-58126FC	
SP02	4858317410	SPEAKER	SP-58126FC	
ZZ290	PTMPMSE251	PCB MAIN MANUAL AS	DTK-29G2FSS-SB	
10	2193110001	SOLDER WIRE	SN-3.0AG (NP303T) 3.0	
20	2193110002	SOLDER WIRE	SN-3.0AG-0.5CU (DHB-RMA3)	
30	2291050617P	FLUX SOLDER	CF-329D	
40	2291050314	FLUX SOLVENT	IM-1000	
C315	CEXF2A470V	C ELECTRO	100V RSS 47MF (10X16) TP	
C403	CMYH3C133J	C MYLAR	1.6KV 0.013MF J	
C405	CMYE2J183J	C MYLAR	630V PU 0.018MF J	
C408	CMYF2G334J	C MYLAR	400V MPU 0.33MF J	
C415	CEXF2E100V	C ELECTRO	250V RSS 10MF (10X20) TP	
C418	CEYD1H689W	C ELECTRO	50V RHD 6.8MF (16X35.5)	
C604	CEXF1E102V	C ELECTRO	25V RSS 1000MF (13X20) TP	
C801	CL1UC3474M	C LINE ACROSS	0.47MF 1J(UCVSNDF/SV	
C802	CL1UC3104M	C LINE ACROSS	WORLD AC250V 0.1UF M R.47	
C805	CEYD2G181D	C ELECTRO	400V FHS 180MF	
C811	CCXR3D681K	C CERA	2KV R 680PF K 125C	
C812	CH1BFE332M	C CERA AC	4.0KV 3300PF M SD AC250V	
C813	CEXF2E101V	C ELECTRO	250V RSS 100MF 18X35.5	

LOC	PART CODE	PART NAME	DESCRIPTION	REMARK
C814	CEXF2E470V	C ELECTRO	250V RSS 47MF (16X25	
C818	CMYF2J224J	C MYLAR	630V MPP 0.22MF J	
C820	CBXB3D471K	C CERA CEMI	2KV BL(N) 470PF K (T)	
C823	CEXF1E102V	C ELECTRO	25V RSS 1000MF (13X20) TP	
C832	CEXF1C222V	C ELECTRO	16V RSS 2200MF(13X25)TP	
C861	CEXF1E102V	C ELECTRO	25V RSS 1000MF (13X20) TP	
C871	CEXF1C102V	C ELECTRO	16V RSS 1000MF (10X20) TP	
D404	DFMP3FU---	DIODE	FMP3FU	
D404A	4857027611	HEAT SINK	AL EX BK	
D404B	7174301051	SCREW TAPPTITE	TT2 RND 3X10 MFZN 3CR	
D707	DLH3PRG03-	LED BLOCK	LH-3P-RG-03	
D810	DRL4A015---	DIODE	RL4A-015-308	
D811	DRL4A015---	DIODE	RL4A-015-308	
D820	DRGP30J---	DIODE	RGP30J	
D860	DRGP30J---	DIODE	RGP30J	
F801	5F3GB4022L	FUSE GLASS TUBE	V/S TL 4A 250V MF51	
I301	1TDA8358J-	IC VERTICAL	TDA8358J	
I301A	4857028227	HEAT SINK	AL EX ANODIZING	
I301B	7174301051	SCREW TAPPTITE	TT2 RND 3X10 MFZN 3CR	
I601	1MSP3411V3	IC SOUND	MSP3411G-PP-B8-V3	
I602	1TDA8946J-	IC AUDIO	TDA8946J	
I602A	4857028215	HEAT SINK	AL EX NO ANODOZING	
I602B	7174301051	SCREW TAPPTITE	TT2 RND 3X10 MFZN 3CR	
I701	1SDA555XFL	IC MICOM OTP	SDA555XFL/PO	
I702	124LC16B1B	IC MEMORY	24LC16B1B	
I703	1451VF6A---	IC PREAMP	451VF6A	
I801	1STRW6754-	IC POWER	STR-W6754	
I801A	4857027920	HEAT SINK	AL EX NO ANODIZING	
I801B	7174301051	SCREW TAPPTITE	TT2 RND 3X10 MFZN 3CR	
I804	1LTV817C---	IC PHOTO COUPLER	LTV-817C	
I820	1K78R05---	IC REGULATOR	KIA78R05PI	
I821	1K78R33---	IC REGULATOR	KIA78R33AP	
I822	1K78R08---	IC REGULATOR	KIA78R08API	
I824	1K78R018P1	IC REGULATOR	KIA78R018PI	
I826	1K78R33---	IC REGULATOR	KIA78R33AP	
JP01	4859102130	JACK EARPHONE	YSC-1537	
JPA1	4859200401	SOCKET RGB	SR-21A1 (ANGLE TYPE)	
JPA2	4859200401	SOCKET RGB	SR-21A1 (ANGLE TYPE)	
JPA3	4859108450	JACK PIN BOARD	YSC03P-4120-14A	
JPA4	4859106740	SVHS JACK	PH-SJ-9505A	
L150	58E0000041	COIL AFT	TRF-A005	
L401	58H0000054	COIL H-LINEARITY	TRL-040F	
L403	58C0000118	COIL CHOKE	CH-191A	
LF801	5PLF24A3---	FILTER LINE	LF-24A3	
LF802	58C0000155	COIL CHOKE PFC	CPC-311A	
M371	4853747800	RETA PCB	NYLON 66	
M372	4853747800	RETA PCB	NYLON 66	
P401	4850705S04	CONN AS	YH025-05+YST025+ULW=400	
P402	4859242420	CONN WAFER	YFW800-04	
P501	4850708N15	CONNECTOR	YH025-08+YBNH250+USW=600	
P601	4859231720	CONN WAFER	YW025-04	
P801	4859242220	CONN WAFER	YFW800-02	
P802	4859242220	CONN WAFER	YFW800-02	
Q401	TST2310DH1	TR	ST2310DHI	
Q401A	4857027930	HEAT SINK	AL EX BK (ANODIZING)	
Q401B	7174301051	SCREW TAPPTITE	TT2 RND 3X10 MFZN 3CR	
R388	RW02Y508FS	R WIRE WOUND	2W 0.5 OHM F SMALL	
R399	RS02Y829JS	R M-OXIDE FILM	2W 8.2 OHM J SMALL	
R401	RS02Y620JS	R M-OXIDE FILM	2W 62 OHM J SMALL	
R402	RS02Y620JS	R M-OXIDE FILM	2W 62 OHM J SMALL	
R410	RS02Y473JS	R M-OXIDE FILM	2W 47K OHM J SMALL	
R415	RS02Y561JS	R M-OXIDE FILM	2W 560 OHM J SMALL	

LOC	PART CODE	PART NAME	DESCRIPTION	REMARK
R419	RS01Y569J-	R M-OXIDE FILM	1W L 5.6 OHM	
R444	RS02Y100JS	R M-OXIDE FILM	2W 10 OHM J SMALL	
R801	DTC7R0M270	POSISTOR	PDC7R0MP6B7Z81C	
R803	RS02Y109JS	R M-OXIDE FILM	2W 1 OHM J SMALL	
R809	RS02Y158JS	R M-OXIDE FILM	2W 0.15 OHM J SMALL	
R819	RX10T339J-	R CEMENT	10W 3.3 OHM J TRIPOD	
R850	RS02Y229JS	R M-OXIDE FILM	2W 2.2 OHM J SMALL	
SF1	5PK3953M—	FILTER SAW	K3953M	
SF2	5PK9650M—	FILTER SAW	K9650M	
SW801	5S40101143	SW PUSH	PS3-22SP (P.C.B)	
T401	50D25A2—	TRANS DRIVE	TD-25A2	
T402	50H0000314	FBT	BSC29-0175M	
T801	50M4950B1-	TRANS SMPS	TSM-4950B1	
U100	4859724930	TUNER VARACTOR	UV1316/AI-4	
X501	5XE20R250E	CRYSTAL QUARTZ	HC-49/U 20.2500MHZ 30PPM	
Y801	5SC0101339	SW RELAY	SDT-S-105LMR	
Z153	5PXXT5R5MB	FILTER CERA	XT 5.5MB (TAPPING)	
ZZ200	PTMPJ2E251	PCB CHIP MOUNT B AS	DTK-29G2FSS-SB	
CC01	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC02	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC03	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC04	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC05	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC06	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC07	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC08	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC10	HCBK471KBA	C CHIP CERA	50V X7R 470PF K 1608	
CC100	HCQK101JBA	C CHIP CERA	50V CH 100PF J 1608	
CC110	HCFK103ZBA	C CHIP CERA	50V Y5V 0.01MF Z 1608	
CC111	HCFK103ZBA	C CHIP CERA	50V Y5V 0.01MF Z 1608	
CC115	HCBK104KBA	C CHIP CERA	50V X7R 0.1MF K 1608	
CC117	HCFK103ZBA	C CHIP CERA	50V Y5V 0.01MF Z 1608	
CC119	HCFK103ZBA	C CHIP CERA	50V Y5V 0.01MF Z 1608	
CC120	HCQK150JBA	C CHIP CERA	50V CH 15PF J 1608	
CC129	HCFK103ZBA	C CHIP CERA	50V Y5V 0.01MF Z 1608	
CC13	HCBK471KBA	C CHIP CERA	50V X7R 470PF K 1608	
CC14	HCBK471KBA	C CHIP CERA	50V X7R 470PF K 1608	
CC15	HCBK471KBA	C CHIP CERA	50V X7R 470PF K 1608	
CC16	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC160	HCFK103ZBA	C CHIP CERA	50V Y5V 0.01MF Z 1608	
CC17	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC18	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC19	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC20	HCBK471KBA	C CHIP CERA	50V X7R 470PF K 1608	
CC21	HCBK471KBA	C CHIP CERA	50V X7R 470PF K 1608	
CC30	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC31	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC32	HCBK222KBA	C CHIP CERA	50V X7R 2200PF K 1608	
CC501	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC502	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC503	HCBK104KBA	C CHIP CERA	50V X7R 0.1MF K 1608	
CC504	HCQK150JBA	C CHIP CERA	50V CH 15PF J 1608	
CC505	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC506	HCBK104KBA	C CHIP CERA	50V X7R 0.1MF K 1608	
CC507	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC508	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC509	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC511	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC512	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC513	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC514	HCBK104KBA	C CHIP CERA	50V X7R 0.1MF K 1608	
CC515	HCQK470JBA	C CHIP CERA	50V CH 47PF J 1608	
CC516	HCQK470JBA	C CHIP CERA	50V CH 47PF J 1608	
CC517	HCBK104KBA	C CHIP CERA	50V X7R 0.1MF K 1608	
CC518	HCBK104KBA	C CHIP CERA	50V X7R 0.1MF K 1608	
CC521	HCBK104KBA	C CHIP CERA	50V X7R 0.1MF K 1608	
CC522	HCBK104KBA	C CHIP CERA	50V X7R 0.1MF K 1608	
CC523	HCBK104KBA	C CHIP CERA	50V X7R 0.1MF K 1608	
CC524	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC526	HCQK220JBA	C CHIP CERA	50V CH 22PF J 1608	
CC527	HCQK220JBA	C CHIP CERA	50V CH 22PF J 1608	

LOC	PART CODE	PART NAME	DESCRIPTION	REMARK
CC528	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC549	HCBK104KBA	C CHIP CERA	50V X7R 0.1MF K 1608	
CC550	HCBK104KBA	C CHIP CERA	50V X7R 0.1MF K 1608	
CC551	HCBK104KBA	C CHIP CERA	50V X7R 0.1MF K 1608	
CC552	HCQK270JBA	C CHIP CERA	50V CH 27PF J 1608	
CC553	HCQK270JBA	C CHIP CERA	50V CH 27PF J 1608	
CC556	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC560	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC561	HCBK104KBA	C CHIP CERA	50V X7R 0.1MF K 1608	
CC568	HCBK104KBA	C CHIP CERA	50V X7R 0.1MF K 1608	
CC569	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC570	HCBK104KBA	C CHIP CERA	50V X7R 0.1MF K 1608	
CC601	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC602	HCBK102KBA	C CHIP CERA	50V X7R 1000PF K 1608	
CC620	HCQK309CBA	C CHIP CERA	50V CH 3PF C 1608	
CC621	HCQK309CBA	C CHIP CERA	50V CH 3PF C 1608	
CC622	HCQK680JBA	C CHIP CERA	50V CH 68PF J 1608	
CC665	HCBK222KBA	C CHIP CERA	50V X7R 2200PF K 1608	
CC667	HCBK222KBA	C CHIP CERA	50V X7R 2200PF K 1608	
CC701	HCFK103ZBA	C CHIP CERA	50V Y5V 0.01MF Z 1608	
CC710	HCBK104KBA	C CHIP CERA	50V X7R 0.1MF K 1608	
CC711	HCBK104KBA	C CHIP CERA	50V X7R 0.1MF K 1608	
CC712	HCQK151JBA	C CHIP CERA	50V CH 150PF J 1608	
CC715	HCBK104KBA	C CHIP CERA	50V X7R 0.1MF K 1608	
CC716	HCFK103ZBA	C CHIP CERA	50V Y5V 0.01MF Z 1608	
CC726	HCQK330JBA	C CHIP CERA	50V CH 33PF J 1608	
CC727	HCQK330JBA	C CHIP CERA	50V CH 33PF J 1608	
CC730	HCBK104KBA	C CHIP CERA	50V X7R 0.1MF K 1608	
CC777	HCBK104KBA	C CHIP CERA	50V X7R 0.1MF K 1608	
I101	14470MFLGD	IC CHIP VIDEO IF	TDA4470-MFLG3	
I501	1VSP9405C4	IC CHIP VIDEO	VSP9405C4	
I502	1DDP3315CQ	IC CHIP	DDP3315CQ	
RC102	HRFT561JBA	R CHIP	1/10 560 OHM J 1608	
RC106	HRFT101JBA	R CHIP	1/10 100 OHM J 1608	
RC107	HRFT101JBA	R CHIP	1/10 100 OHM J 1608	
RC109	HRFT104JBA	R CHIP	1/10 100K OHM J 1608	
RC112	HRFT223JBA	R CHIP	1/10 22K OHM J 1608	
RC114	HRFT472JBA	R CHIP	1/10 4.7K OHM J 1608	
RC118	HRFT151JBA	R CHIP	1/10 150 OHM J 1608	
RC119	HRFT272JBA	R CHIP	1/10 2.7K OHM J 1608	
RC153	HRFT470JBA	R CHIP	1/10 47 OHM J 1608	
RC159	HRFT682JBA	R CHIP	1/10 6.8K OHM J 1608	
RC160	HRFT472JBA	R CHIP	1/10 4.7K OHM J 1608	
RC161	HRFT102JBA	R CHIP	1/10 1K OHM J 1608	
RC169	HRFT222JBA	R CHIP	1/10 2.2K OHM J 1608	
RC177	HRFT562JBA	R CHIP	1/10 5.6K OHM J 1608	
RC179	HRFT222JBA	R CHIP	1/10 2.2K OHM J 1608	
RC501	HRFT101JBA	R CHIP	1/10 100 OHM J 1608	
RC506	HRFT750JBA	R CHIP	1/10 75 OHM J 1608	
RC513	HRFT103JBA	R CHIP	1/10 10K OHM J 1608	
RC516	HRFT471JBA	R CHIP	1/10 470 OHM J 1608	
RC527	HRFT333JBA	R CHIP	1/10 33K OHM J 1608	
RC530	HRFT103JBA	R CHIP	1/10 10K OHM J 1608	
RC532	HRFT223JBA	R CHIP	1/10 22K OHM J 1608	
RC550	HRFT102JBA	R CHIP	1/10 1K OHM J 1608	
RC551	HRFT471JBA	R CHIP	1/10 470 OHM J 1608	
RC560	HRFT102JBA	R CHIP	1/10 1K OHM J 1608	
RC568	HRFT102JBA	R CHIP	1/10 1K OHM J 1608	
RC569	HRFT151JBA	R CHIP	1/10 150 OHM J 1608	
RC580	HRFT821JBA	R CHIP	1/10 820 OHM J 1608	
RC581	HRFT102JBA	R CHIP	1/10 1K OHM J 1608	
RC582	HRFT102JBA	R CHIP	1/10 1K OHM J 1608	
RC583	HRFT102JBA	R CHIP	1/10 1K OHM J 1608	
RC584	HRFT821JBA	R CHIP	1/10 820 OHM J 1608	
RC585	HRFT911JBA	R CHIP	1/10 910 OHM J 1608	
RC586	HRFT911JBA	R CHIP	1/10 910 OHM J 1608	
RC587	HRFT821JBA	R CHIP	1/10 820 OHM J 1608	
RC591	HRFT393JBA	R CHIP	1/10 39K OHM J 1608	
RC595	HRFT271JBA	R CHIP	1/10 270 OHM J 1608	
RC598	HRFT271JBA	R CHIP	1/10 270 OHM J 1608	
RC602	HRFT104JBA	R CHIP	1/10 100K OHM J 1608	

LOC	PART CODE	PART NAME	DESCRIPTION	REMARK
RC610	HRFT103JBA	R CHIP	1/10 10K OHM J 1608	
RC661	HRFT822JBA	R CHIP	1/10 8.2K OHM J 1608	
RC662	HRFT822JBA	R CHIP	1/10 8.2K OHM J 1608	
RC666	HRFT102JBA	R CHIP	1/10 1K OHM J 1608	
RC701	HRFT103JBA	R CHIP	1/10 10K OHM J 1608	
RC702	HRFT472JBA	R CHIP	1/10 4.7K OHM J 1608	
RC712	HRFT101JBA	R CHIP	1/10 100 OHM J 1608	
RC713	HRFT391JBA	R CHIP	1/10 390 OHM J 1608	
RC715	HRFT103JBA	R CHIP	1/10 10K OHM J 1608	
RC720	HRFT101JBA	R CHIP	1/10 100 OHM J 1608	
RC721	HRFT151JBA	R CHIP	1/10 150 OHM J 1608	
RC722	HRFT241JBA	R CHIP	1/10 240 OHM J 1608	
RC723	HRFT391JBA	R CHIP	1/10 390 OHM J 1608	
RC724	HRFT102JBA	R CHIP	1/10 1K OHM J 1608	
RC729	HRFT103JBA	R CHIP	1/10 10K OHM J 1608	
RC730	HRFT223JBA	R CHIP	1/10 22K OHM J 1608	
RC731	HRFT223JBA	R CHIP	1/10 22K OHM J 1608	
RC732	HRFT103JBA	R CHIP	1/10 10K OHM J 1608	
RC733	HRFT103JBA	R CHIP	1/10 10K OHM J 1608	
RC734	HRFT332JBA	R CHIP	1/10 3.3K OHM J 1608	
RC737	HRFT682JBA	R CHIP	1/10 6.8K OHM J 1608	
RC738	HRFT000-BA	R CHIP	1/10 0 OHM 1608	
RC739	HRFT000-BA	R CHIP	1/10 0 OHM 1608	
RC740	HRFT000-BA	R CHIP	1/10 0 OHM 1608	
RC741	HRFT682JBA	R CHIP	1/10 6.8K OHM J 1608	
RC742	HRFT682JBA	R CHIP	1/10 6.8K OHM J 1608	
RC743	HRFT682JBA	R CHIP	1/10 6.8K OHM J 1608	
RC750	HRFT183JBA	R CHIP	1/10 18K OHM J 1608	
RC751	HRFT472JBA	R CHIP	1/10 4.7K OHM J 1608	
RC770	HRFT332JBA	R CHIP	1/10 3.3K OHM J 1608	
RC790	HRFT512JBA	R CHIP	1/10 5.1K OHM J 1608	
RC799	HRFT472JBA	R CHIP	1/10 4.7K OHM J 1608	
RC801	HRFT103JBA	R CHIP	1/10 10K OHM J 1608	
RCA77	HRFT750JBA	R CHIP	1/10 75 OHM J 1608	
ZZ200	PTMPJBE251	PCB MAIN EYE LET AS	DTK-29G2FSS-SB	
E01	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E02	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E03	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E04	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E05	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E06	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E07	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E08	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E09	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E10	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E11	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E12	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E13	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E14	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E15	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E16	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E17	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E18	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E19	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E20	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E21	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E22	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E23	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E24	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E25	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E26	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E30	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E31	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E32	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E33	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E40	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E41	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E42	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E43	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E44	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E45	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	

LOC	PART CODE	PART NAME	DESCRIPTION	REMARK
E46	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E47	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E48	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E49	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E50	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E51	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E52	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E53	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E55	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E56	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E57	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E58	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E59	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E60	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E61	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E62	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E63	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E66	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E67	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E68	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E69	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E70	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E71	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E72	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E73	4856310600	EYE LET	BSR 2.3(R2.3) BIG	
E74	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
E75	4856310300	EYE LET	BSR T0.2 (R1.6) SMALL	
ZZ200	PTMPJRE251	PCB MAIN RADIAL AS	DTK-29G2FSS-SB	
C102	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C106	CEXF1C221V	C ELECTRO	16V RSS 220MF (8X11.5) TP	
C117	CEXF1H229V	C ELECTRO	50V RSS 2.2MF (5X11) TP	
C118	CMXL1J474J	C MYLAR	63V 0.47MF MKT	
C121	CEXF1H470V	C ELECTRO	50V RSS 47MF (6.3*11) TP	
C150	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C152	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C153	CEXF1H229V	C ELECTRO	50V RSS 2.2MF (5X11) TP	
C157	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C164	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C188	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C301	CMXL1J224J	C MYLAR	63V MEU 0.22MF J TP	
C305	CEXF1E221V	C ELECTRO	25V RSS 220MF (8X11.5) TP	
C313	CMXM2A104J	C MYLAR	100V 0.1MF J TP	
C320	CMXM2A104J	C MYLAR	100V 0.1MF J TP	
C350	CMXM2A223J	C MYLAR	100V 0.022MF J TP	
C351	CMXM2A223J	C MYLAR	100V 0.022MF J TP	
C401	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP	
C411	CEXF2C339V	C ELECTRO	160V RSS 3.3MF (8X16) TP	
C416	CXSL2H470J	C CERA	500V SL 47PF J (TAPPING)	
C424	CMXM2A333J	C MYLAR	100V 0.033MF J TP	
C425	CCXB1H472K	C CERA	50V B 4700PF K (TAPPING)	
C500	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C501	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C502	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C503	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C504	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C505	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C524	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C530	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C550	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C551	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C560	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP	
C561	CEXF1H339V	C ELECTRO	50V RSS 3.3MF (5X11) TP	
C568	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP	
C590	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C601	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5*11) TP	
C602	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C605	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C608	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C609	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C610	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C611	CEXF1H339V	C ELECTRO	50V RSS 3.3MF (5X11) TP	

LOC	PART CODE	PART NAME	DESCRIPTION	REMARK
C612	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP	
C613	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP	
C614	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP	
C615	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP	
C616	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C623	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP	
C624	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP	
C625	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP	
C626	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP	
C630	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C634	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C636	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C641	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP	
C642	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP	
C660	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C661	CMXL1J224J	C MYLAR	63V MEU 0.22MF J TP	
C662	CMXL1J224J	C MYLAR	63V MEU 0.22MF J TP	
C668	CMXL1J224J	C MYLAR	63V MEU 0.22MF J TP	
C669	CMXL1J224J	C MYLAR	63V MEU 0.22MF J TP	
C690	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5*11) TP	
C691	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5*11) TP	
C709	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP	
C711	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP	
C713	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C730	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C733	CEXF1H229V	C ELECTRO	50V RSS 2.2MF (5X11) TP	
C737	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C742	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C744	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C803	CCXF3A472Z	C CERA	1KV F 4700PF Z (T)	
C804	CCXF3A472Z	C CERA	1KV F 4700PF Z (T)	
C806	CEXF1H220V	C ELECTRO	50V RSS 22MF (5X11) TP	
C807	CCXB1H471K	C CERA	50V B 470PF K (TAPPING)	
C808	CMXM2A473J	C MYLAR	100V 0.047MF J TP	
C809	CCXB1H821K	C CERA	50V B 820PF K (TAPPING)	
C810	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP	
C835	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C845	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP	
C846	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP	
C860	CMXL2E104K	C MYLAR	250V 0.1MF K MEU TP	
C862	CMXM2A104J	C MYLAR	100V 0.1MF J TP	
C863	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP	
C866	CCXB3A471K	C CERA	1KV B 470PF K (T)	
C876	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C880	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP	
CA20	CCXB1H222K	C CERA	50V B 2200PF K (TAPPING)	
F801A	4857415001	CLIP FUSE	PFC5000-0702	
F801B	4857415001	CLIP FUSE	PFC5000-0702	
I704	1K1A7025AP	IC RESET	KIA7025AP	
I803	1K1A431B—	IC REGULATOR(SHUNT)	KIA431B 2.495V 0.5% TO-92	
L101	5CPX479K—	COIL PEAKING	4.7UH K RADIAL	
L501	5CPX479K—	COIL PEAKING	4.7UH K RADIAL	
L802	58CX430599	COIL CHOKE	AZ-9004Y 940K TP	
Q103	T2SC5343Y-	TR	2SC5343Y	
Q104	T2SC5343Y-	TR	2SC5343Y	
Q110	T2SC5343Y-	TR	2SC5343Y	
Q150	T2SC5343Y-	TR	2SC5343Y	
Q151	T2SC5343Y-	TR	2SC5343Y	
Q333	T2SC5343Y-	TR	2SC5343Y	
Q334	T2SC5343Y-	TR	2SC5343Y	
Q402	T2SD1207T-	TR	2SD1207-T (TAPPING)	
Q501	T2SA1980Y-	TR	2SA1980Y	
Q502	T2SC5343Y-	TR	2SC5343Y	
Q542	T2SA1980Y-	TR	2SA1980Y	
Q543	T2SA1980Y-	TR	2SA1980Y	
Q544	T2SA1980Y-	TR	2SA1980Y	
Q550	T2SC5343Y-	TR	2SC5343Y	
Q601	T2SA1980Y-	TR	2SA1980Y	
Q603	T2SA1980Y-	TR	2SA1980Y	
Q604	T2SC5343Y-	TR	2SC5343Y	
Q605	T2SC5343Y-	TR	2SC5343Y	

LOC	PART CODE	PART NAME	DESCRIPTION	REMARK
Q701	T2SC5343Y-	TR	2SC5343Y	
Q702	T2SA1980Y-	TR	2SA1980Y	
Q730	T2SC5343Y-	TR	2SC5343Y	
Q731	T2SC5343Y-	TR	2SC5343Y	
Q812	TKTC3203Y-	TR	KTC3203-Y	
Q860	T2SC5343Y-	TR	2SC5343Y	
Q861	T2SC5343Y-	TR	2SC5343Y	
R331	RN02B241JS	R METAL FILM	2W 240 OHM J SMALL	
R332	RN02B241JS	R METAL FILM	2W 240 OHM J SMALL	
R854	RN02B229JS	R METAL FILM	2W 2.2 OHM J SMALL	
SW700	5S50101090	SW TACT	SKHV17910A	
SW701	5S50101090	SW TACT	SKHV17910A	
SW702	5S50101090	SW TACT	SKHV17910A	
SW703	5S50101090	SW TACT	SKHV17910A	
SW704	5S50101090	SW TACT	SKHV17910A	
X502	5XEX5R000E	CRYSTAL QUARTZ	HC-49/U 5.00MHZ 30PPM	
X601	5XEX18R43E	CRYSTAL QUARTZ	HC-49/U 18.432MHZ 30PPM TP	
X701	5XEX6R000C	CRYSTAL QUARTZ	HC-49/U 6.000M 20PPM TP	
Z603	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF	
Z604	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF	
ZA20	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF	
ZA21	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF	
ZZ200	PTMPJAE251	PCB MAIN AXIAL AS	DTK-29G2FSS-SB	
10	2TM10006LB	TAPE MASKING	3M #232-MAP-C 6.2X2000M (W/O GLUE)	
20	2TM14006LB	TAPE MASKING	3M #232 6.0X2000M (WITH GLUE)	
A001	4859813993	PCB MAIN	CP-850/F DTK-28/29 (330X246)	
C161	CZCH1H220J	C CERA	50V CH 22PF J (AXIAL)	
C508	CCZB1H473K	C CERA	50V B 0.047MF K (AXIAL)	
C509	CCZB1H473K	C CERA	50V B 0.047MF K (AXIAL)	
C510	CCZB1H473K	C CERA	50V B 0.047MF K (AXIAL)	
C515	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z (AXIAL)	
C516	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z (AXIAL)	
C517	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z (AXIAL)	
C518	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z (AXIAL)	
C519	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z (AXIAL)	
C532	CCZB1H103K	C CERA	50V B 0.01MF K (AXIAL)	
C534	CCZB1H103K	C CERA	50V B 0.01MF K (AXIAL)	
C536	CCZB1H102K	C CERA	50V B 1000PF K (AXIAL)	
C537	CCZB1H103K	C CERA	50V B 0.01MF K (AXIAL)	
C538	CCZB1H103K	C CERA	50V B 0.01MF K (AXIAL)	
C540	CCZB1H333K	C CERA	50V B 0.033MF K (AXIAL)	
C553	CCZB1H103K	C CERA	50V B 0.01MF K (AXIAL)	
C557	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z (AXIAL)	
C558	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z (AXIAL)	
C578	CCZB1H561K	C CERA	50V B 560PF K (AXIAL)	
C579	CCZB1H561K	C CERA	50V B 560PF K (AXIAL)	
C589	CCZB1H561K	C CERA	50V B 560PF K (AXIAL)	
C650	CZSL1H680J	C CERA	50V SL 68PF J (AXIAL)	
C712	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z (AXIAL)	
D100	DUZ33B——	DIODE ZENER	UZ-33B	
D101	D1N4148——	DIODE	1N4148 (TAPPING)	
D103	DBA282——	DIODE	BA282	
D313	DRGP15J——	DIODE	RGP15J	
D405	D1N4937G—	DIODE	1N4937G	
D408	D1N4937G—	DIODE	1N4937G	
D409	D1N4937G—	DIODE	1N4937G	
D410	D1N4937G—	DIODE	1N4937G	
D414	D1N4004S—	DIODE	1N4004S	
D415	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
D530	D1N4148——	DIODE	1N4148 (TAPPING)	
D531	D1N4148——	DIODE	1N4148 (TAPPING)	
D535	D1N4148——	DIODE	1N4148 (TAPPING)	
D540	D1N4148——	DIODE	1N4148 (TAPPING)	
D541	D1N4148——	DIODE	1N4148 (TAPPING)	
D550	D1N4148——	DIODE	1N4148 (TAPPING)	
D551	D1N4148——	DIODE	1N4148 (TAPPING)	
D602	D1N4148——	DIODE	1N4148 (TAPPING)	
D701	D1N4148——	DIODE	1N4148 (TAPPING)	
D702	D1N4148——	DIODE	1N4148 (TAPPING)	
D730	DUZ7R5BM—	DIODE ZENER	UZ-7.5BM 7.5V	
D777	DTZX5V6B—	DIODE ZENER	TZX5V6B (TAPPING)	

LOC	PART CODE	PART NAME	DESCRIPTION	REMARK
D801	DLT2A05G—	DIODE	LT2A05G	
D802	DLT2A05G—	DIODE	LT2A05G	
D803	DLT2A05G—	DIODE	LT2A05G	
D804	DLT2A05G—	DIODE	LT2A05G	
D805	D1N4937G—	DIODE	1N4937G	
D806	D1N4937G—	DIODE	1N4937G	
D807	D1N4148---	DIODE	1N4148 (TAPPING)	
D809	DTZX6V2---	DIODE ZENER	TZX6V2B (TAPPING)	
D812	D1N4148---	DIODE	1N4148 (TAPPING)	
D840	D1N4004S—	DIODE	1N4004S	
D850	D1N4937G—	DIODE	1N4937G	
D851	D1N4937G—	DIODE	1N4937G	
D861	DMTZJ4R7B-	DIODE ZENER	MTZJ 4R7B 52MM	
D870	D1N4937G—	DIODE	1N4937G	
DA11	DTZX5V6B—	DIODE ZENER	TZX5V6B (TAPPING)	
DA16	DTZX5V6B—	DIODE ZENER	TZX5V6B (TAPPING)	
DA17	DTZX5V6B—	DIODE ZENER	TZX5V6B (TAPPING)	
DA20	DTZX5V6B—	DIODE ZENER	TZX5V6B (TAPPING)	
DA27	DTZX5V6B—	DIODE ZENER	TZX5V6B (TAPPING)	
J047	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J101	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J102	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J103	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J106	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J110	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J112	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J125	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J128	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J130	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J135	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J136	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J142	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J143	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J145	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J154	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J155	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J156	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J159	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J160	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J201	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J232	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J234	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J236	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J240	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J243	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J276	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J278	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J287	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J288	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J289	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J290	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J291	RD-4Z100J-	R CARBON FILM	1/4 10 OHM J	
J300	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J301	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J305	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J306	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J307	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J308	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J309	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J310	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J311	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J312	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J315	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J320	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J322	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J324	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J325	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J327	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J328	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J329	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J330	85801060GY	WIRE COPPER	1/0.6 TIN COATING	

LOC	PART CODE	PART NAME	DESCRIPTION	REMARK
J331	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J332	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J336	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J337	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J338	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J339	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J340	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J341	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J342	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J344	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J345	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J347	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J348	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J350	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J351	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J353	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J354	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J355	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J356	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J357	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J358	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J359	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J362	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J363	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J365	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J366	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J367	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J368	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J369	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J371	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J373	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J374	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J375	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J377	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J378	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J379	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J380	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J381	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J382	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J383	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J385	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J387	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J388	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J389	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J390	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J391	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J392	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J394	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J396	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J397	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J398	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J399	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J400	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J401	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J403	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J404	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J405	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J406	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J407	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J408	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J409	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J410	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J411	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J412	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J413	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J414	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J416	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J417	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J418	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J419	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J420	85801060GY	WIRE COPPER	1/0.6 TIN COATING	

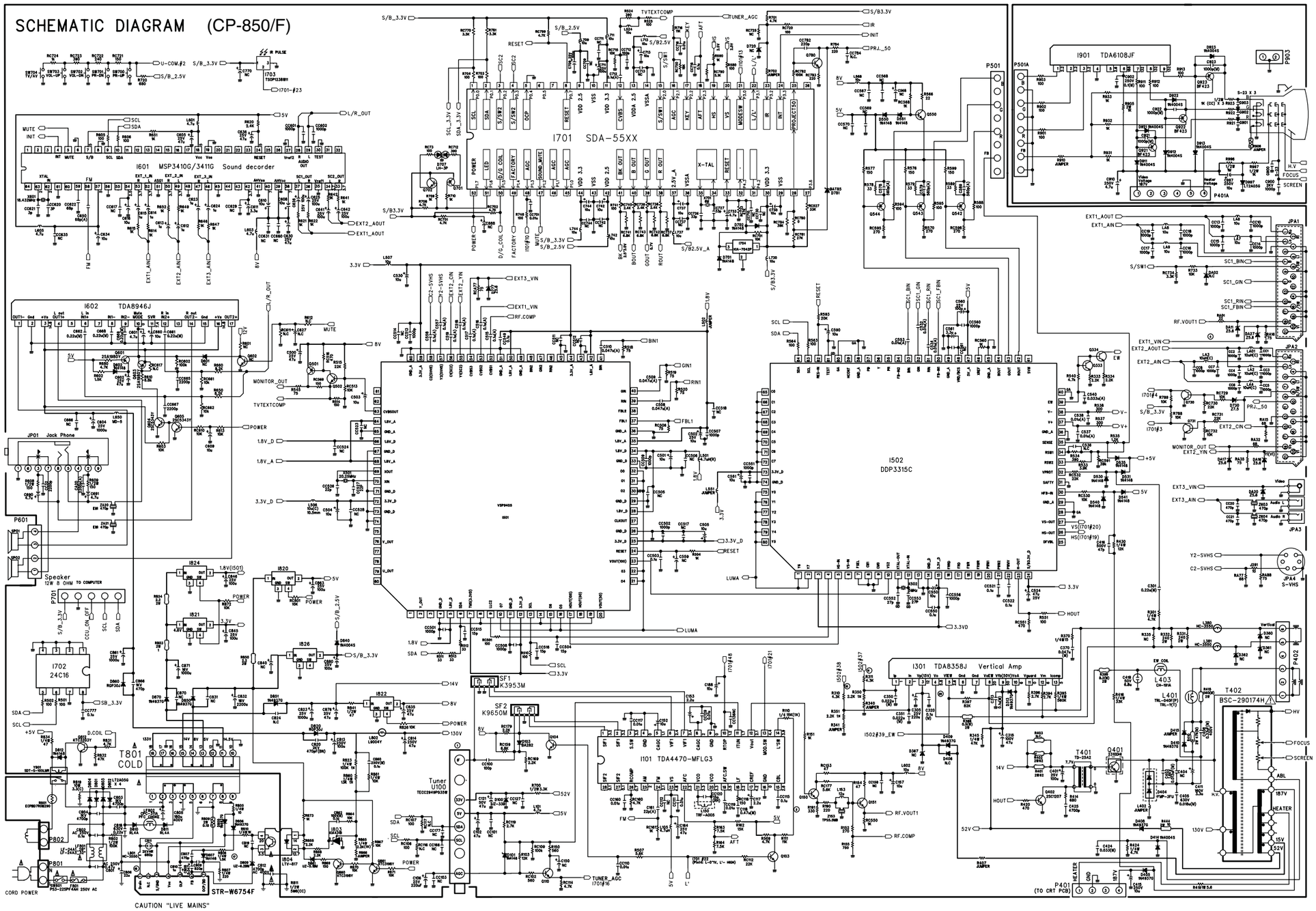
LOC	PART CODE	PART NAME	DESCRIPTION	REMARK
J423	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J426	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J427	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J429	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J430	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J431	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J432	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J433	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J434	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J435	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J440	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J450	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J460	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J483	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J501	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J510	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J601	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J602	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J603	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J610	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J701	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J702	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J703	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J704	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J707	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J801	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J810	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J811	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J812	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J814	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J815	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J816	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J817	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J819	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J820	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J821	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J822	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J823	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J824	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J825	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
J889	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
L105	5CPZ479K02	COIL PEAKING	4.7UH 3.5MM K (LAL02TB)	
L153	5CPZ120K02	COIL PEAKING	12UH 3.5MM K (LAL02TB)	
L380	5MC0000100	COIL BEAD	MD-5 (HC-3550)	
L381	5MC0000100	COIL BEAD	MD-5 (HC-3550)	
L402	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
L502	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
L506	5CPZ479K04	COIL PEAKING	4.7UH 10.5MM K (LAL04TB)	
L507	5CPZ100K02	COIL PEAKING	10UH 3.5MM K (LAL02TB)	
L524	5CPZ100K02	COIL PEAKING	10UH 3.5MM K (LAL02TB)	
L551	8580l060GY	WIRE COPPER	1/0.6 TIN COATING	
L568	5CPZ100K02	COIL PEAKING	10UH 3.5MM K (LAL02TB)	
L601	5CPZ479K02	COIL PEAKING	4.7UH 3.5MM K (LAL02TB)	
L602	5CPZ100K02	COIL PEAKING	10UH 3.5MM K (LAL02TB)	
L603	5CPZ479K02	COIL PEAKING	4.7UH 3.5MM K (LAL02TB)	
L605	5CPZ479K02	COIL PEAKING	4.7UH 3.5MM K (LAL02TB)	
L650	5MC0000100	COIL BEAD	MD-5 (HC-3550)	
L709	5CPZ100K02	COIL PEAKING	10UH 3.5MM K (LAL02TB)	
L711	5CPZ100K02	COIL PEAKING	10UH 3.5MM K (LAL02TB)	
L713	5CPZ100K02	COIL PEAKING	10UH 3.5MM K (LAL02TB)	
L730	5CPZ100K02	COIL PEAKING	10UH 3.5MM K (LAL02TB)	
L737	5CPZ100K02	COIL PEAKING	10UH 3.5MM K (LAL02TB)	
L742	5CPZ100K02	COIL PEAKING	10UH 3.5MM K (LAL02TB)	
L744	5CPZ100K02	COIL PEAKING	10UH 3.5MM K (LAL02TB)	
L801	5MC0000100	COIL BEAD	MD-5 (HC-3550)	
LA01	5CPZ100K04	COIL PEAKING	10UH 10.5MM K (LAL04TB)	
LA02	5CPZ100K04	COIL PEAKING	10UH 10.5MM K (LAL04TB)	
LA03	5CPZ100K04	COIL PEAKING	10UH 10.5MM K (LAL04TB)	

LOC	PART CODE	PART NAME	DESCRIPTION	REMARK
LA04	5CPZ100K04	COIL PEAKING	10UH 10.5MM K (LAL04TB)	
LA06	5CPZ100K04	COIL PEAKING	10UH 10.5MM K (LAL04TB)	
LA07	5CPZ100K04	COIL PEAKING	10UH 10.5MM K (LAL04TB)	
LA08	5CPZ100K04	COIL PEAKING	10UH 10.5MM K (LAL04TB)	
LA09	5CPZ100K04	COIL PEAKING	10UH 10.5MM K (LAL04TB)	
R103	RD-AZ123J-	R CARBON FILM	1/6 12K OHM J	
R110	RN-4Z1502F	R METAL FILM	1/4 15K OHM F	
R111	RD-AZ113J-	R CARBON FILM	1/6 11K OHM J	
R150	RD-AZ561J-	R CARBON FILM	1/6 560 OHM J	
R151	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R152	RD-AZ271J-	R CARBON FILM	1/6 270 OHM J	
R154	RD-AZ470J-	R CARBON FILM	1/6 47 OHM J	
R155	RD-AZ751J-	R CARBON FILM	1/6 750 OHM J	
R162	RD-AZ153J-	R CARBON FILM	1/6 15K OHM J	
R163	RD-AZ752J-	R CARBON FILM	1/6 7.5K OHM J	
R164	RD-AZ752J-	R CARBON FILM	1/6 7.5K OHM J	
R190	RD-AZ221J-	R CARBON FILM	1/6 220 OHM J	
R191	RD-AZ331J-	R CARBON FILM	1/6 330 OHM J	
R301	RD-4Z472J-	R CARBON FILM	1/4 4.7K OHM J	
R310	RD-AZ432J-	R CARBON FILM	1/6 4.3K OHM J	
R311	RD-AZ432J-	R CARBON FILM	1/6 4.3K OHM J	
R333	RD-AZ222J-	R CARBON FILM	1/6 2.2K OHM J	
R334	RD-AZ222J-	R CARBON FILM	1/6 2.2K OHM J	
R340	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
R341	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
R345	RD-4Z473J-	R CARBON FILM	1/4 47K OHM J	
R350	RN-AZ2201F	R METAL FILM	1/6 2.2K OHM F	
R351	RN-AZ2201F	R METAL FILM	1/6 2.2K OHM F	
R394	RD-AZ272J-	R CARBON FILM	1/6 2.7K OHM J	
R395	RD-4Z564J-	R CARBON FILM	1/4 560K OHM J	
R396	RD-AZ272J-	R CARBON FILM	1/6 2.7K OHM J	
R397	RD-AZ823J-	R CARBON FILM	1/6 82K OHM J	
R407	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
R414	RD-AZ681J-	R CARBON FILM	1/6 680 OHM J	
R416	RD-4Z333J-	R CARBON FILM	1/4 33K OHM J	
R420	RD-AZ471J-	R CARBON FILM	1/6 470 OHM J	
R424	RD-4Z472J-	R CARBON FILM	1/4 4.7K OHM J	
R430	RD-4Z123J-	R CARBON FILM	1/4 12K OHM J	
R501	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R502	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R504	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R507	RD-AZ562J-	R CARBON FILM	1/6 5.6K OHM J	
R509	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R510	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R511	RD-AZ330J-	R CARBON FILM	1/6 33 OHM J	
R512	RD-AZ330J-	R CARBON FILM	1/6 33 OHM J	
R513	RD-AZ330J-	R CARBON FILM	1/6 33 OHM J	
R514	RD-AZ151J-	R CARBON FILM	1/6 150 OHM J	
R515	RD-AZ223J-	R CARBON FILM	1/6 22K OHM J	
R518	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J	
R519	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J	
R520	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J	
R524	RD-AZ391J-	R CARBON FILM	1/6 390 OHM J	
R525	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R533	RD-AZ392J-	R CARBON FILM	1/6 3.9K OHM J	
R534	RD-AZ391J-	R CARBON FILM	1/6 390 OHM J	
R535	RD-AZ122J-	R CARBON FILM	1/6 1.2K OHM J	
R537	RD-AZ301J-	R CARBON FILM	1/6 300 OHM J	
R538	RD-AZ301J-	R CARBON FILM	1/6 300 OHM J	
R540	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R545	RD-AZ220J-	R CARBON FILM	1/6 22 OHM J	
R551	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R563	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R564	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R566	RD-AZ220J-	R CARBON FILM	1/6 22 OHM J	
R570	RD-AZ271J-	R CARBON FILM	1/6 270 OHM J	
R576	RD-AZ151J-	R CARBON FILM	1/6 150 OHM J	
R577	RD-AZ151J-	R CARBON FILM	1/6 150 OHM J	

LOC	PART CODE	PART NAME	DESCRIPTION	REMARK
R578	RD-AZ330J-	R CARBON FILM	1/6 33 OHM J	
R579	RD-AZ330J-	R CARBON FILM	1/6 33 OHM J	
R580	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R588	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R589	RD-AZ330J-	R CARBON FILM	1/6 33 OHM J	
R590	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R593	RD-AZ203J-	R CARBON FILM	1/6 20K OHM J	
R594	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R595	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R599	RD-AZ151J-	R CARBON FILM	1/6 150 OHM J	
R602	RD-AZ152J-	R CARBON FILM	1/6 1.5K OHM J	
R603	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R605	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R606	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R608	RD-2Z151J-	R CARBON FILM	1/2 150 OHM J	
R609	RD-2Z151J-	R CARBON FILM	1/2 150 OHM J	
R610	RD-AZ682J-	R CARBON FILM	1/6 6.8K OHM J	
R613	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R614	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R615	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R620	RD-AZ242J-	R CARBON FILM	1/6 2.4K OHM J	
R621	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R622	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R641	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R642	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R646	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R647	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R649	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R650	RD-AZ822J-	R CARBON FILM	1/6 8.2K OHM J	
R651	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R652	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R660	RD-AZ822J-	R CARBON FILM	1/6 8.2K OHM J	
R680	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R700	RD-2Z332J-	R CARBON FILM	1/2 3.3K OHM J	
R702	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
R703	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R704	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R708	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R709	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R710	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R716	RD-AZ113J-	R CARBON FILM	1/6 11K OHM J	
R720	RD-AZ681J-	R CARBON FILM	1/6 680 OHM J	
R733	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R741	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R748	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R781	RD-AZ332J-	R CARBON FILM	1/6 3.3K OHM J	
R788	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R789	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R802	RD-2Z104J-	R CARBON FILM	1/2 100K OHM J	
R805	RD-4Z100J-	R CARBON FILM	1/4 10 OHM J	
R806	RD-4Z152J-	R CARBON FILM	1/4 1.5K OHM J	
R807	RD-4Z221J-	R CARBON FILM	1/4 220 OHM J	
R810	RD-4Z102J-	R CARBON FILM	1/4 1K OHM J	
R811	RC-2Z565KP	R CARBON COMP	1/2 5.6M OHM K	
R823	RN-4Z1003F	R METAL FILM	1/4 100K OHM F	
R826	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R831	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R832	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J	
R834	RD-4Z470J-	R CARBON FILM	1/4 47 OHM J	
R841	RD-2Z470J-	R CARBON FILM	1/2 47 OHM J	
R855	RD-AZ222J-	R CARBON FILM	1/6 2.2K OHM J	
R860	RN-4Z1302F	R METAL FILM	1/4 13K OHM F	
R861	RD-4Z103J-	R CARBON FILM	1/4 10K OHM J	
R862	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R864	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R865	RN-4Z2201F	R METAL FILM	1/4 2.2K OHM F	
R866	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
R867	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	

LOC	PART CODE	PART NAME	DESCRIPTION	REMARK
R868	RD-AZ222J-	R CARBON FILM	1/6 2.2K OHM J	
R869	RD-AZ151J-	R CARBON FILM	1/6 150 OHM J	
R870	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R871	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R872	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
RA01	RD-AZ220J-	R CARBON FILM	1/6 22 OHM J	
RA15	RD-AZ680J-	R CARBON FILM	1/6 68 OHM J	
RA16	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J	
RA32	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J	
RA35	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J	
RA77	RD-AZ680J-	R CARBON FILM	1/6 68 OHM J	
RA88	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J	
ZZ310	PTCPMSE251	PCB CRT MANUAL AS	DTK-29G2FSS-SB	
C900	CCXB3D102K	C CERA	2KV B 1000 PF K (TAPPING)	
C910	CEXF2E479V	C ELECTRO	250V RSS 4.7MF (10X16)TP	
C997	CEXF2E100V	C ELECTRO	250V RSS 10MF (10X20) TP	
I901	1TDA6108JF	IC VIDEO	TDA6108JF	
I901A	4857025401	HEAT SINK	A1050P-H24 T2	
I901B	7174300851	SCREW TAPPTITE	TT2 RND 3X8 MFZN 3CR	
P401A	4859231820	CONN WAFER	YW025-05	
P501A	4859235120	CONN WAFER	YW025-08	
P903	4859238620	CONN WAFER	YPW500-02	
SCT1	4859304130	SOCKET CRT	ISHG93S	
ZZ200	PTCPJRE251	PCB CRT RADIAL AS	DTK-29G2FSS-SB	
C902	CMXL2E104K	C MYLAR	250V 0.1MF K MEU TP	
C921	CMXM2A102J	C MYLAR	100V 1000PF J TP	
C922	CMXM2A102J	C MYLAR	100V 1000PF J TP	
C923	CMXM2A102J	C MYLAR	100V 1000PF J TP	
G900	4SG0DX0001	SPARK GAP	SSG-102-A1 (1.0KV)	
G901	4SG0DX0001	SPARK GAP	SSG-102-A1 (1.0KV)	
G902	4SG0DX0001	SPARK GAP	SSG-102-A1 (1.0KV)	
G903	4SG0DX0001	SPARK GAP	SSG-102-A1 (1.0KV)	
Q921	TBF423——	TR	BF423 TO-92	
Q922	TBF423——	TR	BF423 TO-92	
Q923	TBF423——	TR	BF423 TO-92	
R905	RN02B102JS	R METAL FILM	2W 1K OHM J SMALL	
ZZ200	PTCPJAE251	PCB CRT AXIAL AS	DTK-29G2FSS-SB	
A001	4859829013	PCB CRT	CP-830/830F (DTG/DTH)	
D911	D1N4004S—	DIODE	1N4004S	
D912	D1N4004S—	DIODE	1N4004S	
D913	D1N4004S—	DIODE	1N4004S	
D921	D1N4004S—	DIODE	1N4004S	
D922	D1N4004S—	DIODE	1N4004S	
D923	D1N4004S—	DIODE	1N4004S	
D997	DLT2A05G—	DIODE	LT2A05G	
R901	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R902	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R903	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R906	85801060GY	WIRE COPPER	1/0.6 TIN COATING	
R911	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R912	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R913	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R921	RC-2Z102K-	R CARBON COMP	1/2 1K OHM K	
R922	RC-2Z102K-	R CARBON COMP	1/2 1K OHM K	
R923	RC-2Z102K-	R CARBON COMP	1/2 1K OHM K	
R931	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R932	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R933	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R996	RD-2Z105J-	R CARBON FILM	1/2 1M OHM J	
R997	RD-2Z102J-	R CARBON FILM	1/2 1K OHM J	

7. SCHEMATIC DIAGRAM



NOTE:
1. RESISTANCE IS SHOWN IN OHM. K=1000, M=1000000
2. UNLESS OTHERWISE NOTED IN SCHEMATIC ALL CAPACITOR VALUES ARE EXPRESSED IN uF
3. VOLTAGES READ WITH "VTVM" FROM POINT INDICATED TO CHASSIS GROUND USING A COLOR BAR SIGNAL WITH ALL CONTROLS AT NORMAL LINE 230V AC VOLTAGE READINGS SHOWN ARE NORMAL VALUES AND MAY VARY +20x EXCEPT H.V
4. THIS CIRCUIT DIAGRAM IS A STANDARD ONE CIRCUIT PRINTED MAY BE SUBJECT TO CHANGE FOR PRODUCT IMPROVEMENT WITHOUT PRIOR NOTICE

WARNING:
BEFORE SERVICING THE CHASSIS, READ "X-RAY RADIATION", "SAFETY PRECAUTION", AND "PRODUCT SAFETY NOTICE" IN SERVICE MANUAL

CAUTION TO SERVICE TECHNICIANS:
BEFORE RETURNING THE RECEIVER TO CUSTOMER, LEAKAGE CURRENT OR RESISTANCE MEASUREMENTS SHOULD BE PERFORMED TO DETERMINE THAT EXPOSED PARTS ARE PROPERLY INSULATED FROM THE SUPPLY CIRCUIT.

RESISTOR			CAPACITOR			COIL		
CARBON FILM			ELECTRO			PEAKING		
R M-OXIDE		(M)	CERAMIC			CHOKE		(C)
CARBON COMP		(CC)	CERAMIC CH		(CH)	BEAD		(B)
FUSIBLE		(F)	ELECTRO NONPOLAR					
CEMENT		(C)	MYLAR		(M)			

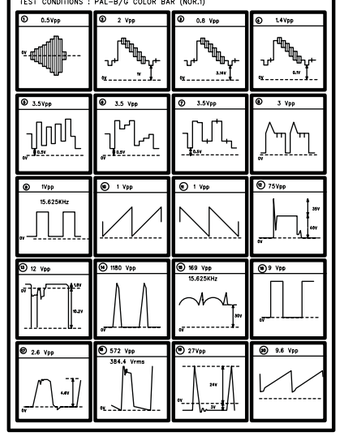
THE DIFFERENT PARTS FOR CRT

MAKER	LG Philips		Thomson		Samsung	
Aspect	4:3	16:9	4:3	16:9	4:3	16:9
Y501	A68EMF853X044		A68ELM0201X21		A68QFK793X104	
C404	1.5KV 0.01NF				1.5KV 0.01NF	
C406	400V 0.33NF				400V 0.33NF	
L401	TRL-040F				TRL-4R3D	

THE DIFFERENT PARTS FOR Virtual dolby Surround

LOC.	w/o VDS model	with VDS model
I601	MSP3410G	MSP3411G
CC601	50V X7R 4700PF	50V X7R 1000PF
CC602	50V X7R 4700PF	50V X7R 1000PF
CC653	50V X7R 4700PF	50V X7R 2200PF
CC657	50V X7R 4700PF	50V X7R 2200PF

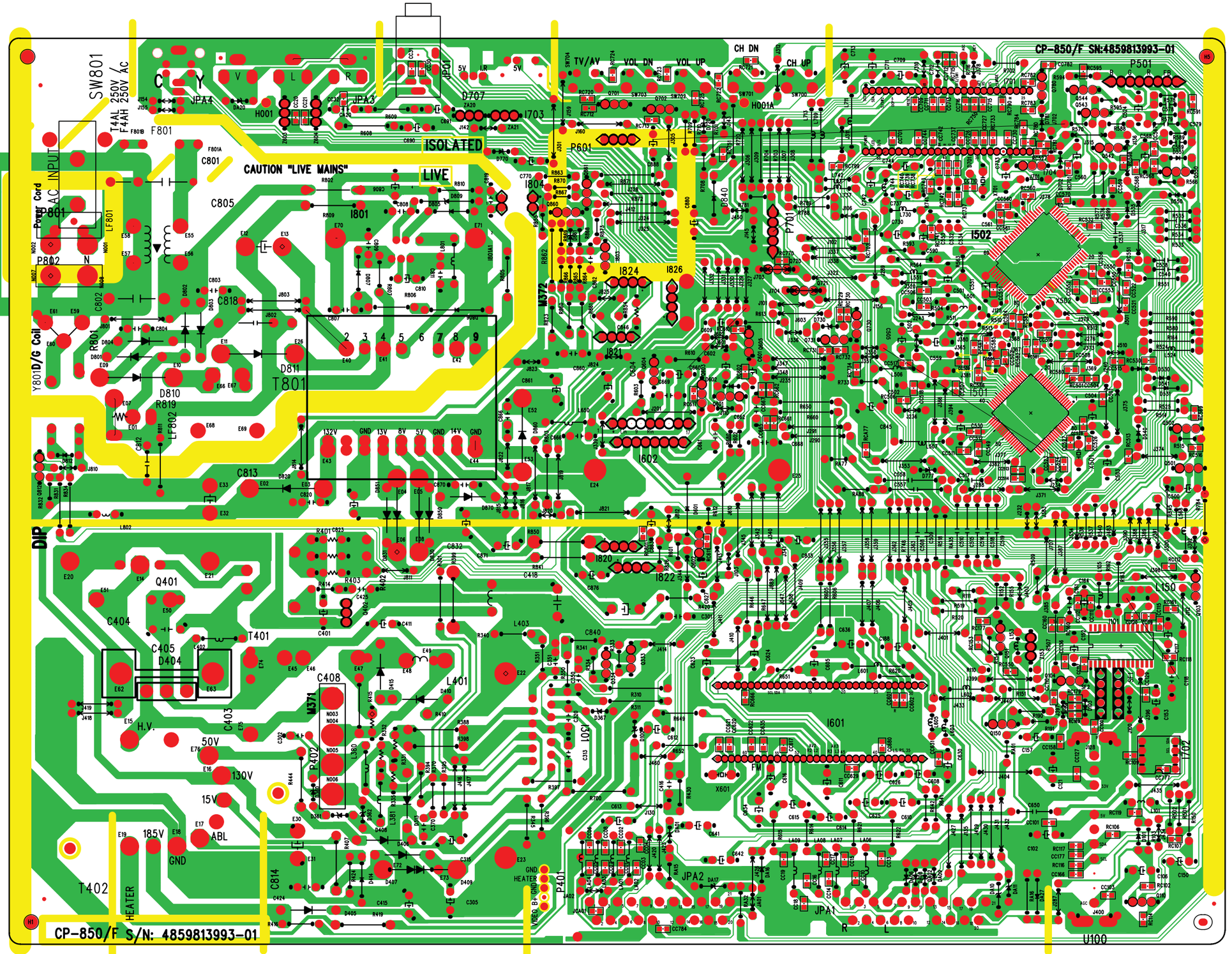
* WAVEFORMS
TEST CONDITIONS : PAL-B/G COLOR BAR (NOR.1)



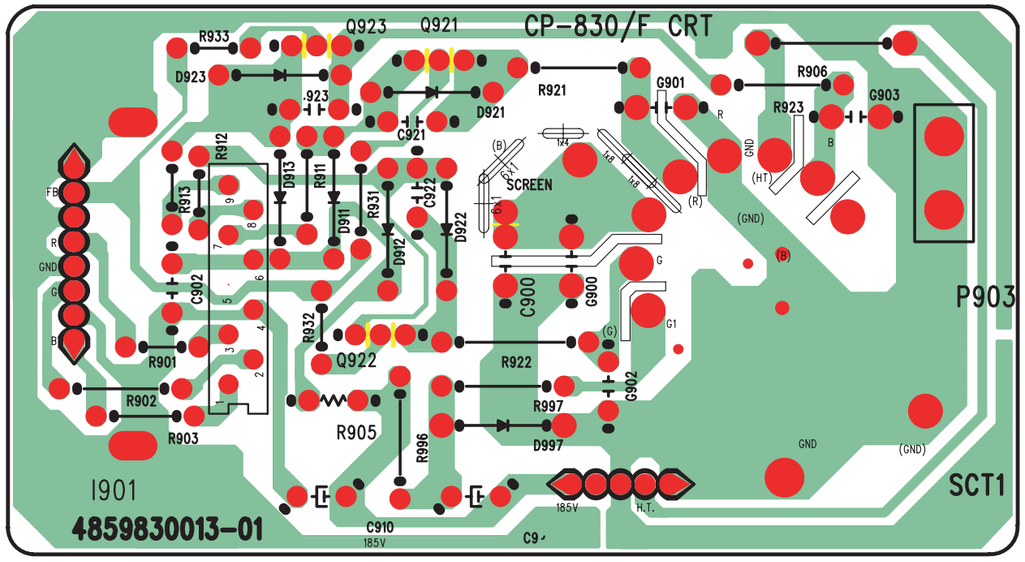
S/N : 4859813993-00

PRODUCT SAFETY NOTE :
THE COMPONENTS MARKED WITH ⚠ ARE IMPORTANT FOR MAINTAINING THE SAFETY OF THE SET AND SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL OR SPECIFIED ONE IN THE PART LIST. DON'T DEGRADE THE SAFETY OF THE SET THROUGH IMPROPER SERVICING.

8. PRINTED CIRCULT BOARD

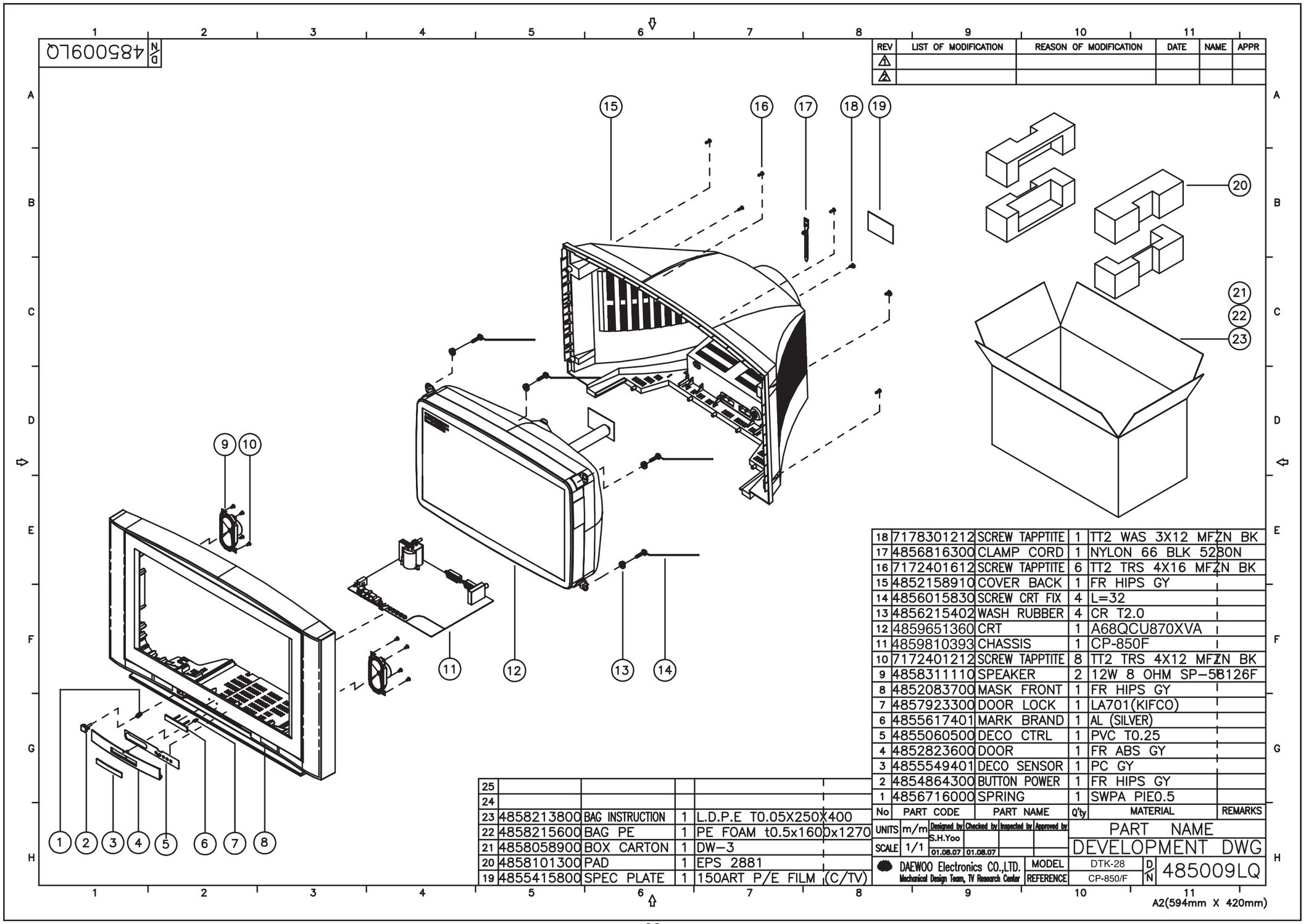


PRINTED CIRCULT BOARD



CP-850/F CRT PCB SN : 4859830013-01

9. EXPLODED VIEW



REV	LIST OF MODIFICATION	REASON OF MODIFICATION	DATE	NAME	APPR
1					
2					

No	PART CODE	PART NAME	Q'ty	MATERIAL	REMARKS
18	7178301212	SCREW TAPPTITE	1	TT2 WAS 3X12 MFZN BK	
17	4856816300	CLAMP CORD	1	NYLON 66 BLK 5280N	
16	7172401612	SCREW TAPPTITE	6	TT2 TRS 4X16 MFZN BK	
15	4852158910	COVER BACK	1	FR HIPS GY	
14	4856015830	SCREW CRT FIX	4	L=32	
13	4856215402	WASH RUBBER	4	CR T2.0	
12	4859651360	CRT	1	A68QCU870XVA	
11	4859810393	CHASSIS	1	CP-850F	
10	7172401212	SCREW TAPPTITE	8	TT2 TRS 4X12 MFZN BK	
9	4858311110	SPEAKER	2	12W 8 OHM SP-58126F	
8	4852083700	MASK FRONT	1	FR HIPS GY	
7	4857923300	DOOR LOCK	1	LA701(KIFCO)	
6	4855617401	MARK BRAND	1	AL (SILVER)	
5	4855060500	DECO CTRL	1	PVC T0.25	
4	4852823600	DOOR	1	FR ABS GY	
3	4855549401	DECO SENSOR	1	PC GY	
2	4854864300	BUTTON POWER	1	FR HIPS GY	
1	4856716000	SPRING	1	SWPA PIE0.5	

25				
24				
23	4858213800	BAG INSTRUCTION	1	L.D.P.E T0.05X250X400
22	4858215600	BAG PE	1	PE FOAM t0.5x1600x1270
21	4858058900	BOX CARTON	1	DW-3
20	4858101300	PAD	1	EPS 2881
19	4855415800	SPEC PLATE	1	150ART P/E FILM (C/TV)

UNITS	m/m	Designed by: S.H.Yoo 01.08.07	Checked by: 01.08.07	Inspected by / Approved by
SCALE	1/1			

DAEWOO Electronics CO.,LTD. Mechanical Design Team, TV Research Center

MODEL: DTK-28 | REFERENCE: CP-850/F | D/N: 485009LQ

PART NAME: DEVELOPMENT DWG

A2(594mm X 420mm)

DAEWOO ELECTRONICS CORP.
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PRINTED DATE : JUN. 2006